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PARTMENT OF ROADS

ENNIAL REPORT

1961 62

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GEORGE O. GRANT
B.Sc., M.E., P. Eng.
COMMISSIONER OF ROADS

DEPARTMENT OF ROADS

75 EGLINTON AVENUE EAST HU. 1-6171
TORONTO 12. August 1, 1963.

Government
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William R. Allen, Esq., Q.C., Chairman,
and Members of the Council of
The Municipality of Metropolitan Toronto.

Ladies and Gentlemen:-

I forward herewith, for your information, Biennial Report of the Department of Roads of The Municipality of Metropolitan Toronto. It covers the operations of the Department for the years 1961 and 1962.

Yours very truly,

G. O. Grant

ET

Commissioner of Roads.

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Retiring Chairman of Metropolitan Council,

FREDERICK G. GARDINER, Q.C., LL.D.,
(1953-1961)

Congratulating and investing his successor,

WILLIAM R. ALLEN, Q.C.,

With the Chain of Office.

January 9, 1962.

Committees of Council - The two Committees of Council pertinent to the Department of Roads are the Executive Committee and the Transportation Committee (formerly the Roads and Traffic Committee). Their membership for the two years embraced by this report was as follows:-

1961	1962
EXECUTIVE COMMITTEE	
F. G. Gardiner, Q.C. (Chairman)	W. R. Allen, Q.C. (Chairman)
W. R. Allen, Q.C.	W. L. Archer
A. M. Campbell	A. M. Campbell
C. H. Hiscott	N. C. Goodhead
N. Phillips, Q.C.	Mrs. D. Hague
D. D. Summerville	N. Phillips, Q.C.
H. O. Waffle	D. D. Summerville
TRANSPORTATION COMMITTEE	
Mrs. M. Curtis (Chairman)	G. W. Bull (Chairman)
W. L. Archer	A. M. Campbell
G. W. Bull	W. Dennison
A. M. Campbell	H. M. Griggs
H. Menzies	H. Menzies
D. D. Summerville	D. D. Summerville

The Metropolitan Chairman is ex-officio a member of the Transportation Committee.

IF YOU CAN KEEP A LEVE
HEAD IN ALL THIS CONFUSIO
YOU JUST DONT UNDERSTAN
THE SITUATION!

The day "The Chief" retired

- BYRON WILLSON BEMROSE, B.A.Sc., P.Eng. -

The occasion on which he left behind a clean desk, from behind which he had rendered many clear and vital decisions in response to many complex and pressing questions.

Presentation of painting commissioned by one of his friends, in recognition of his service as Assistant Chief Engineer of the Toronto and York Roads Commission from 1928 to 1953, and as Chief Project Engineer of the Metropolitan Department of Roads from 1954 to April 13, 1962.

****

Mr. Bemrose was succeeded as Chief Project Engineer of the Department by Mr. Hubert S. Watson, who had previously held the post of Maintenance and Construction Engineer, and who joined the staff of the Toronto and York Roads Commission in May, 1949.

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Cover: Section of Bayview Avenue Interchange with Lawrence Avenue.

Shown is the unusual treatment of the retaining walls, which was achieved by the casting and placing of concrete and colored tiles in a bas relief mural.

The mural is contained in a series of panels, and allegorically reflects the progressive development of highway systems.

****

Photo Credits: Turofsky, Hunting Survey Corporation, Toronto Star, Department of Highways, McCullagh, Panda, Bruce.

- FOREWORD -

As 1962 ended, the statistical record of the Metropolitan Department of Roads indicated completion of the following projects in the nine-year period since its organization on January 1, 1954:-

Structures:			
Railway Grade Separations - New	21		
- do. - - Reconstructed	3		
Other Bridges	65	89	
New Roads		24.78	miles
Existing Roads Reconstructed		8.03	"
Pavement Widenings		54.20	"
Resurfacing of Pavements		125.78	"
Intersectional Improvements		154	
Major Repairs to Bridges		6	
Overpasses Widened		1	

Capital costs during this period were as follows:-

		$
1954	-	4,120,164
1955	-	10,231,814
1956	-	15,567,954
1957	-	15,888,326
1958	-	13,491,954
1959	-	13,858,094
1960	-	27,216,097
1961	-	23,950,330
1962	-	29,263,276

Figures pertinent to the foregoing are -

	Jan. 1, 1954	Dec. 31, 1962
Population of Metropolitan Toronto	1,174,002	1,625,405
Vehicle Registration, Metropolitan Toronto	289,814	585,000
Persons per Vehicle	4.05	2.78

- CAPITAL WORKS UNDERTAKEN -

Frederick G. Gardiner Expressway - Following opening of the first section of this major project from the Humber River to Jameson Avenue in 1958, emphasis was placed on completion of the stretch of Expressway which would carry traffic into down-town Toronto.

Commencing with on-fill and in-cut construction from Jameson Avenue to a point mid-way behind the Canadian National Exhibition grounds, the Expressway then changed in form to an elevated structure.

On August 1, 1962, barriers were removed and traffic found itself travelling from the Humber to Spadina Avenue in five minutes. Then, on December 3, 1962, due to the construction schedule having been advanced some months because of very satisfactory progress made by the contractor, the west-bound lanes were opened from York Street. (East-bound lanes to York Street will be opened in mid-Summer, 1963).

The length of the Expressway now opened for two-way traffic is 5.1 miles, and the west-bound section from York Street to Spadina Avenue measures a further 0.7 mile.

While progress was being made in the west end of the City, heavy construction was taking place between Jarvis Street and the Don River. Contracts have been let here for 1.3 miles of structure, which will comprise the first stage of constructing the Expressway from the east end to the centre of the City.

Design work has been completed which will permit a 1963 start on construction in the centre of the City, which will join the west and east ends of the Expressway. This section has been designed aesthetically to eliminate a feeling of massiveness and enhance redevelopment through this area.

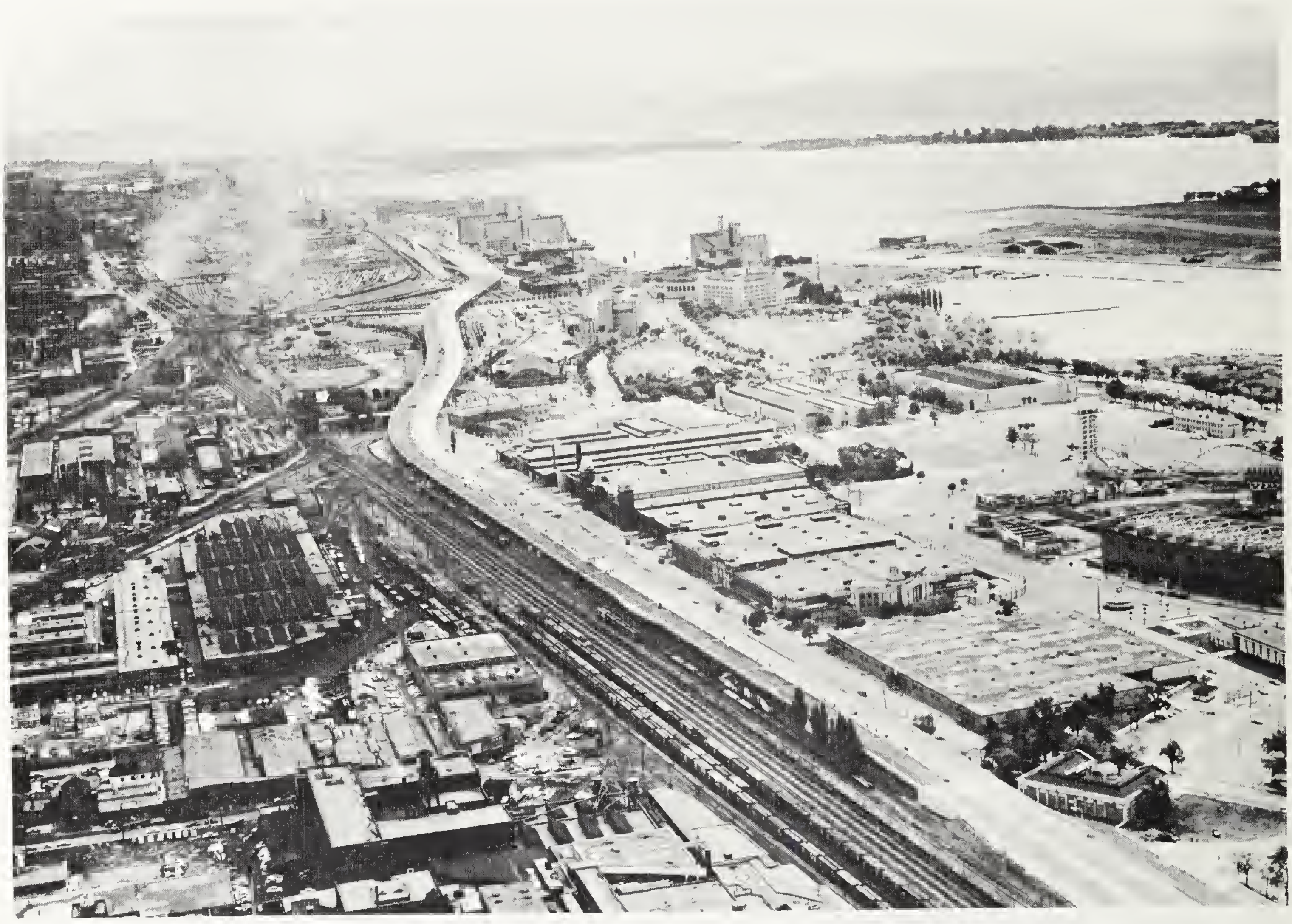
From the Humber to mid-City, six lanes have been provided while through the section east of Yonge Street to the Don River eight lanes will carry the traffic. East of the Don River, the Expressway again tapers to six lanes.

Access points to and from the Expressway are or will be at The South Kingsway, Jameson Avenue, Dunn Avenue, Spadina Avenue, Rees Street, York Street, Bay Street, Yonge Street, Jarvis Street, Sherbourne Street, Don Valley Parkway and Leslie Street.

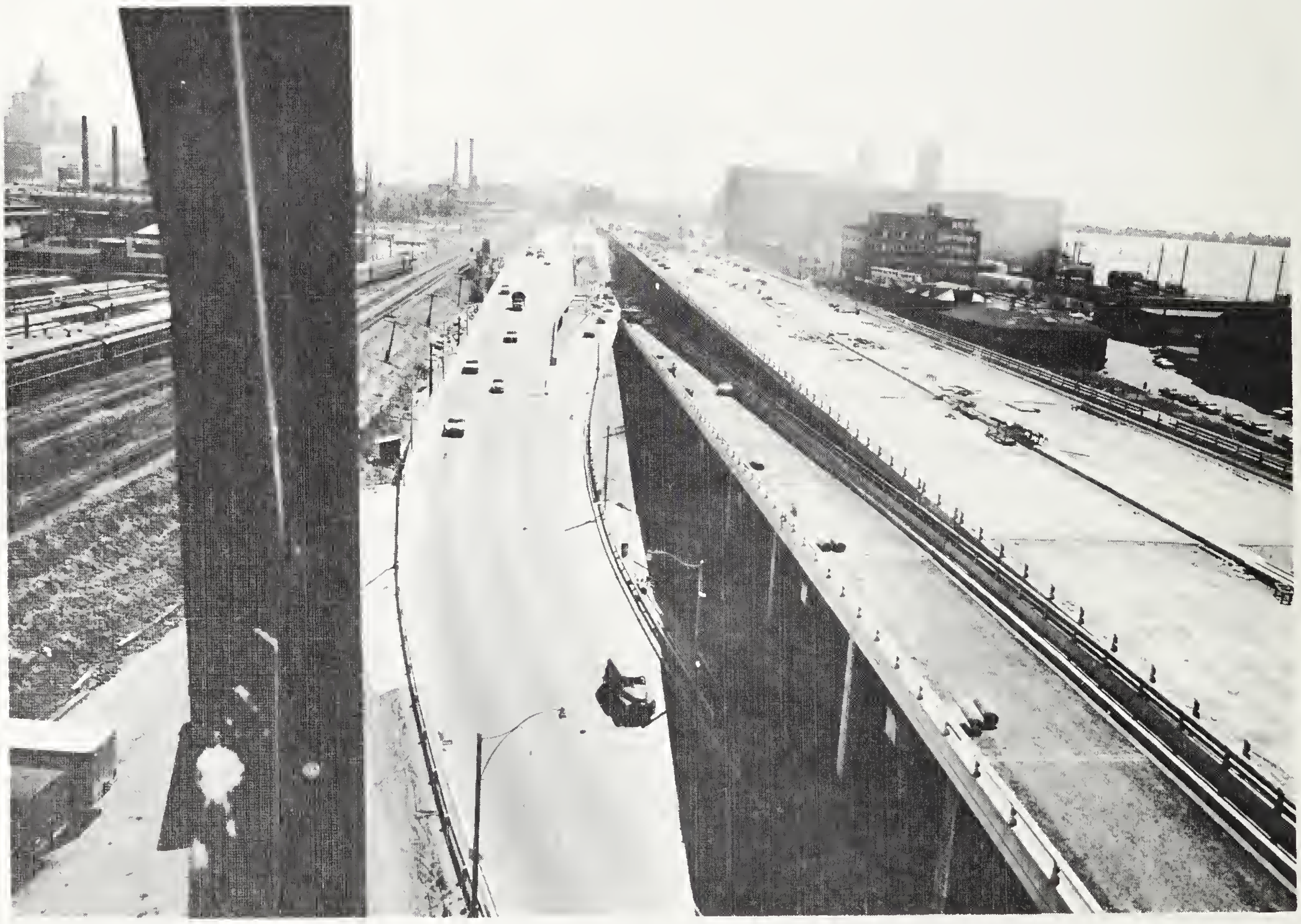
Progress on the project, generally, is running ahead of schedule, and this is primarily due to job organization, new ideas and methods introduced by contractors. In all, 39 contracts have been let on this Expressway project and experience gained on one job has benefited work on the next. Groups, in effect, have become teams of experts, and repetition of functions with minor variations has enabled them to become extremely efficient at their specialities. The net result will likely be that the Expressway will be in complete operation in 1966. Then a motorist will be able to cover the distance between the Humber and Don Rivers in less than ten minutes.

Expenditure on the entire project to December 31, 1962, was $62,842,827.

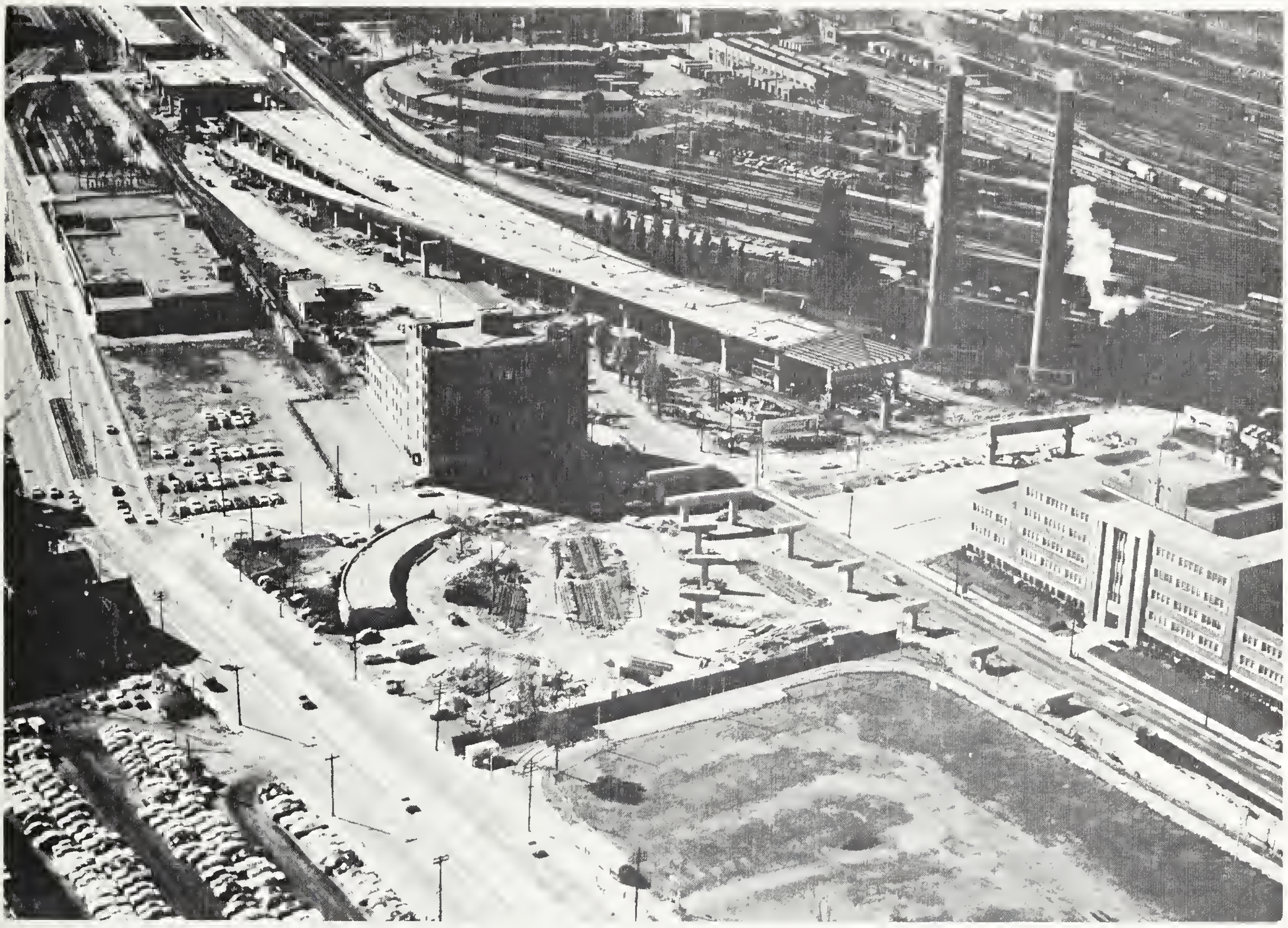
There was an additional expenditure of $579,493 for engineering studies and land acquisition for the Scarborough Extension of the Expressway.



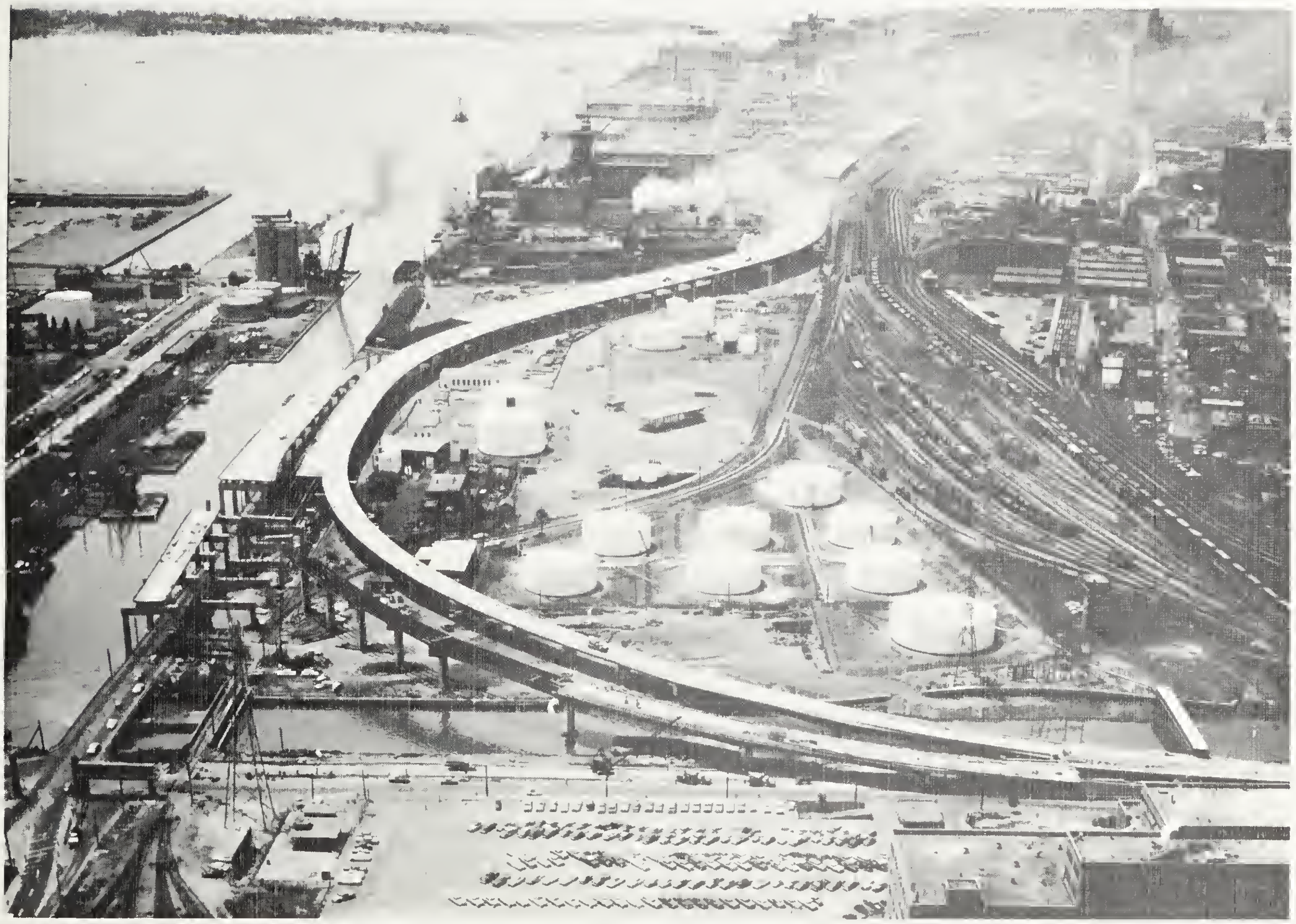
FREDERICK G. GARDINER EXPRESSWAY: At Exhibition Grounds



At Bathurst Street



At York Street



At Don River

Don Valley Parkway - On August 31, 1961, The Honourable Leslie M. Frost, Q.C., performed one of his last public functions as Prime Minister of the Province of Ontario, when he officially opened the first section of the Don Valley Parkway, which extends from Bloor Street to Eglinton Avenue.

The occasion also marked the final appearance of Mr. Frederick G. Gardiner at one of the many ceremonial openings of projects of which he, as Chairman of Metropolitan Council, had been the inspiring and driving force.

A further distinction of the occasion was the presence of Mrs. Marie Curtis, Reeve of the Village of Long Branch and an original member of Metropolitan Council, who officiated as Mistress of Ceremonies in accordance with her office of Chairman of the Metropolitan Roads and Traffic Committee.

This 4.6 mile stretch of the Parkway was constructed as a controlled-access, divided highway, with three lanes in each direction, and included the relocation of Don Mills Road.

Construction on the second section, 1.3 miles in length, from Eglinton Avenue to Lawrence Avenue, was commenced in July, 1961. It includes two railway underpasses, one street underpass, and a bridge over the Don River. Additional work on the river itself includes a realignment secured by concrete channel-linings and two check dams to control water velocities.

One of the railway underpasses in this section is an unusual structure, being a massive two-barrel arch with retaining walls, which are faced with cut field-stone so as to blend with the rustic atmosphere of the Valley. Construction of a conventional bridge at this point was not feasible because of the vertical disparity in the profiles of the roadway and railway tracks. Twenty feet of earth embankment is being placed on top of the arches to meet the railway grade.

The Parkway severs some portions of park land in this area and these are connected by two pedestrian underpasses of interesting design.

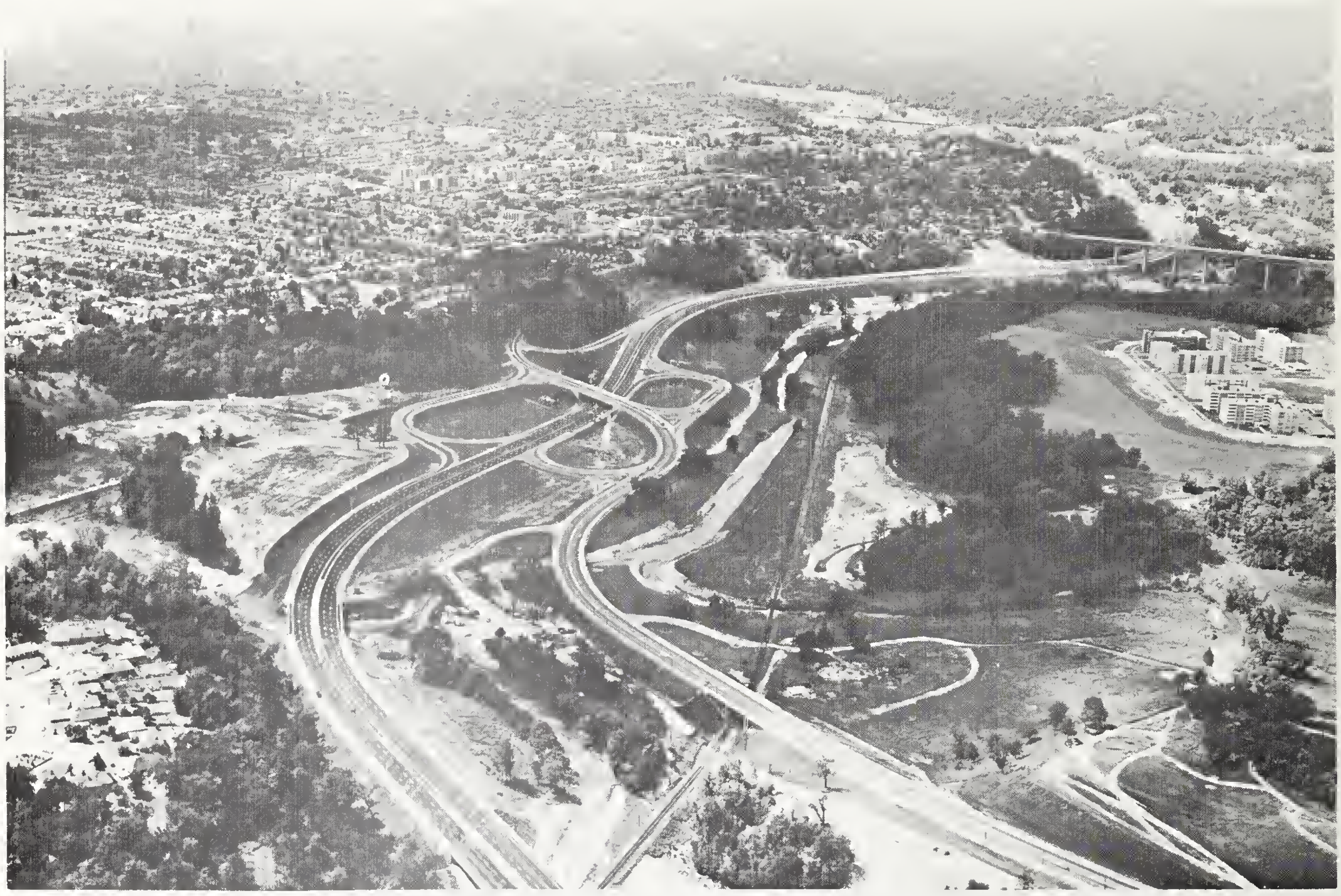
This section of the Parkway brings into view a vista of the Don Valley in a rural setting, completely devoid of housing or industry, which hitherto has been concealed from the public.

OPENING OF THE DON VALLEY PARKWAY
August 31, 1961

Mrs. Marie Curtis	The Honourable Leslie M. Frost, Q.C., LL.D., D.C.L.	Frederick G. Gardiner, Q.C., LL.D.

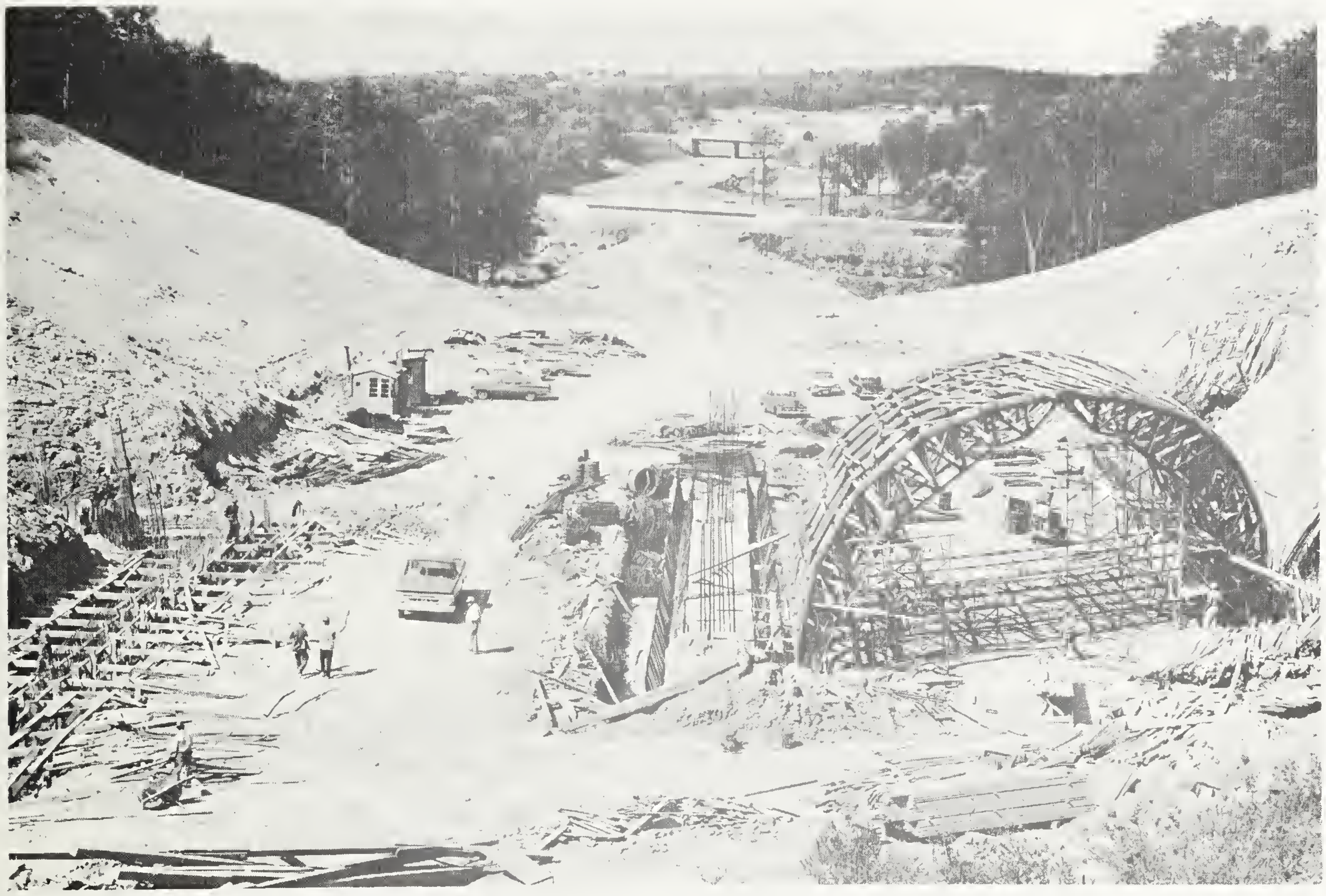
The sub-soils forming the cradle of the Don Valley are mainly glacial in origin. They consist mostly of layers and irregular masses of clay till, interspersed with intermittent layers, veins and pockets of granular materials. Water percolating down the Valley slopes, which have been cut and resorted by the River, and cut again by the bull-dozers, produces some strange and unpredictable effects.

The Department has, as a matter of policy, refrained from expropriating marginal properties at the top of the slopes unless they have been threatened by subsidence resulting from the aforementioned soil and water conditions. This course was adopted in consideration of adjacent land-owners, many of whom located there because of the panorama, and because of the over-all cost of such property acquisition for slope protection.

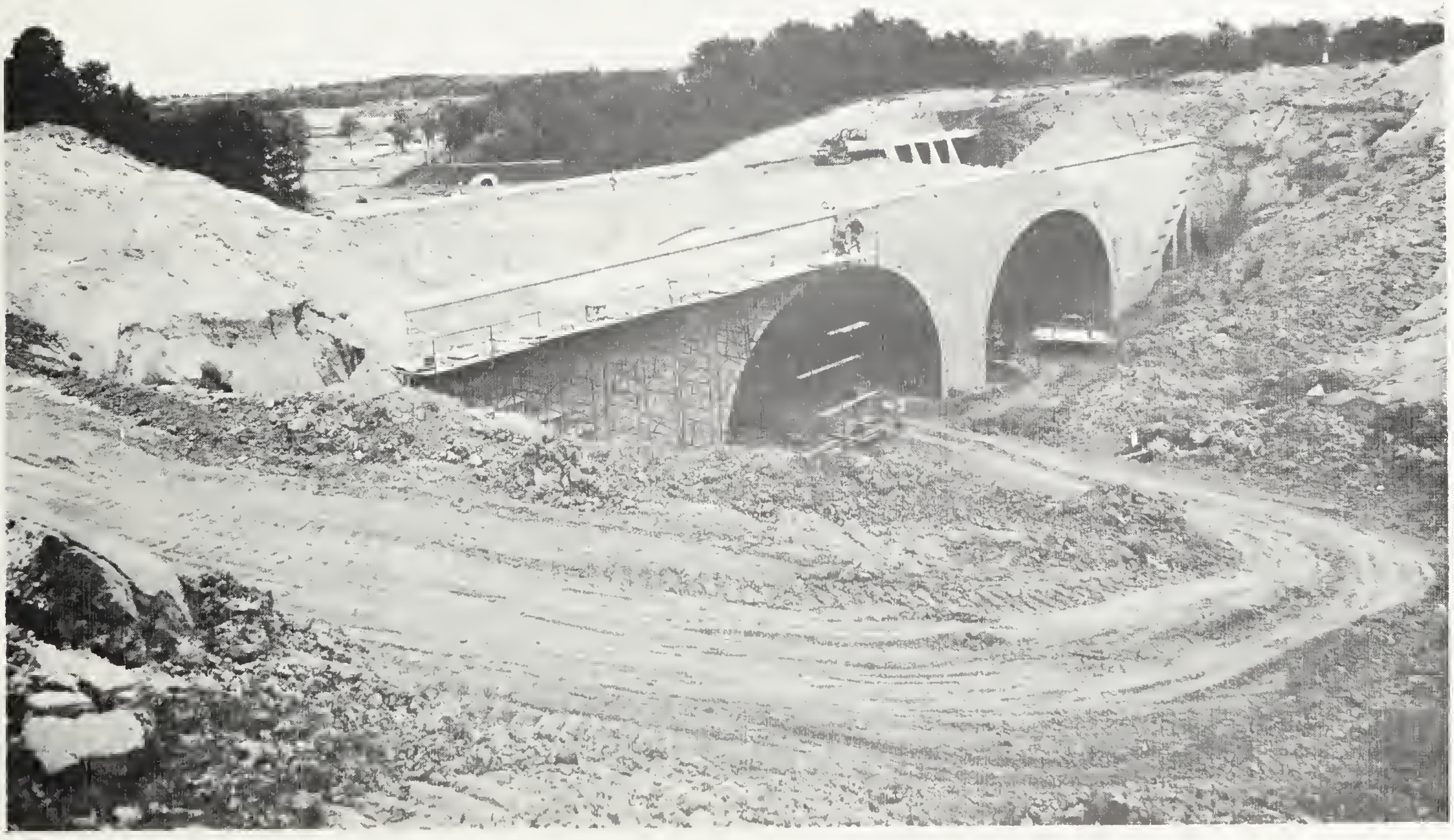


Above: Completed Section of Don Valley Parkway, at Interchange with Don Mills Road.

Below: Construction on Don Valley Parkway, at Interchange with Lawrence Avenue.



Construction of Two-Barrel Arch and Other Structures on Don Valley Parkway.



Some slippages have occurred, and the necessary drainage works and retaining walls have been built to restrain them. Some future soil movements may yet be expected, and this situation is under close surveillance.

The third section, from Bloor Street southerly to the Frederick G. Gardiner Expressway, a distance of 1.6 miles, was commenced in October, 1962.

It occupies a low bank on the east side of the Don River, and 160,000 square feet of steel sheet piling was driven along the edge to contain the embankment at a height of eight feet above the normal river level. The portion of the embankment adjacent to the piling has been back-filled with slag, since its lighter weight will reduce the dead load on the piling.

It was necessary to relocate three major oil pipe lines, as well as a number of utilities on this section. During reconstruction of the Dundas Street East Bridge, the eastern-most span was lengthened to permit the Parkway to pass underneath, and a similar undertaking is being carried out by the City of Toronto in its repair of the Queen Street Bridge.

The present scheduling of contracts is based on completion of the section from Eglinton Avenue to Lawrence Avenue in the Fall of 1963, and the section from Bloor Street to the Frederick G. Gardiner Expressway one year later.

Expenditure on the Parkway, and all its related works, totalled $23,960,498 to December 31, 1962.

Duke-Duchess Connection to Don Valley Parkway -

The Frederick G. Gardiner Expressway was originally planned to end at the Don River, where it would connect directly with the Don Valley Parkway. This plan, however, was changed in 1957, when it was decided to extend the Expressway into the Township of Scarborough. This meant that the central section of the Expressway across the waterfront would require to do double-duty, carrying traffic from both the Parkway and the Scarborough Extension. This would result in overloading of the Expressway's central section, particularly the north-south connections leading into the City's down-town business district.

The obvious solution was to find an exit for Parkway traffic before it reached the Expressway.

The conclusion was reached that Duke and Duchess Streets presented the most desirable connections inasmuch as they were not operating to capacity because of a lack of continuity and would provide a fluid alignment free from interference by local traffic. Both thoroughfares serve important destination areas, and, respectively, could be linked with Adelaide and Richmond Streets, which the City of Toronto was operating as one-way routes. A further factor in the determination was that the City was eliminating the Duke-Adelaide and Duchess-Richmond jogs at Jarvis Street.

This project also involves the relocation of Eastern Avenue to the north, so that it will cross on the same structure as the Interchange over the Don River. This will also eliminate the need for an expensive grade separation which had been proposed by the City of Toronto where Eastern Avenue crosses the C.N.R. and C.P.R. tracks.

The Ontario Municipal Board authorized the Connection as a related work of the Don Valley Parkway to a limit of $10,000,000. The City is to contribute $1,000,000 of this amount because of the improvement of Eastern Avenue.

Extensive property settlements were made in 1962, and the contract was scheduled for call early in 1963. Completion is scheduled for the Fall of 1965.

Don Mills Road - Because the Don Valley Parkway, from York Mills Road to Steele's Avenue, will occupy the right-of-way of the existing Woodbine Avenue, the character of the latter thoroughfare will change from a local road to a fully-controlled access road. The areas adjacent to the present Woodbine Avenue will, therefore, require an alternative route for land access.

Approval was consequently given in 1961 to the development of an extension of Don Mills Road, between York Mills Road and Steele's Avenue, with a basic right-of-way width of 120 feet for a distance of 4-1/2 miles, at an estimated cost of $3,750,000.

The first contract, which was for a bridge over the Don River, was let late in 1962. A second contract to be called will be for a bridge over Highway 401 and roadwork between York Mills Road and Sheppard Avenue.

Spadina Expressway - Studies in connection with the third phase of the Metropolitan Expressway System — the Spadina Expressway — initiated in 1959, culminated with the presentation of a functional report in December, 1961, which detailed the alignment, grades, interchanges, and estimated costs. Interest in the proposal was of such magnitude that a series of public hearings was held at which many opinions were voiced.

On March 6, 1962, Council approved the project at an estimated cost of $73,680,000. Approval covered the route of the Expressway from Bloor Street to a connection with Wilson Heights Boulevard near Clanton Park Road, with traffic interchanges at Bathurst Street, Eglinton Avenue, Lawrence Avenue and Highway 401. It was decided that property was to be acquired on the basis of a six-lane expressway, but that the initial pavement be limited to four lanes. Bridges and other structures, however, are to be constructed according to a six-lane design.

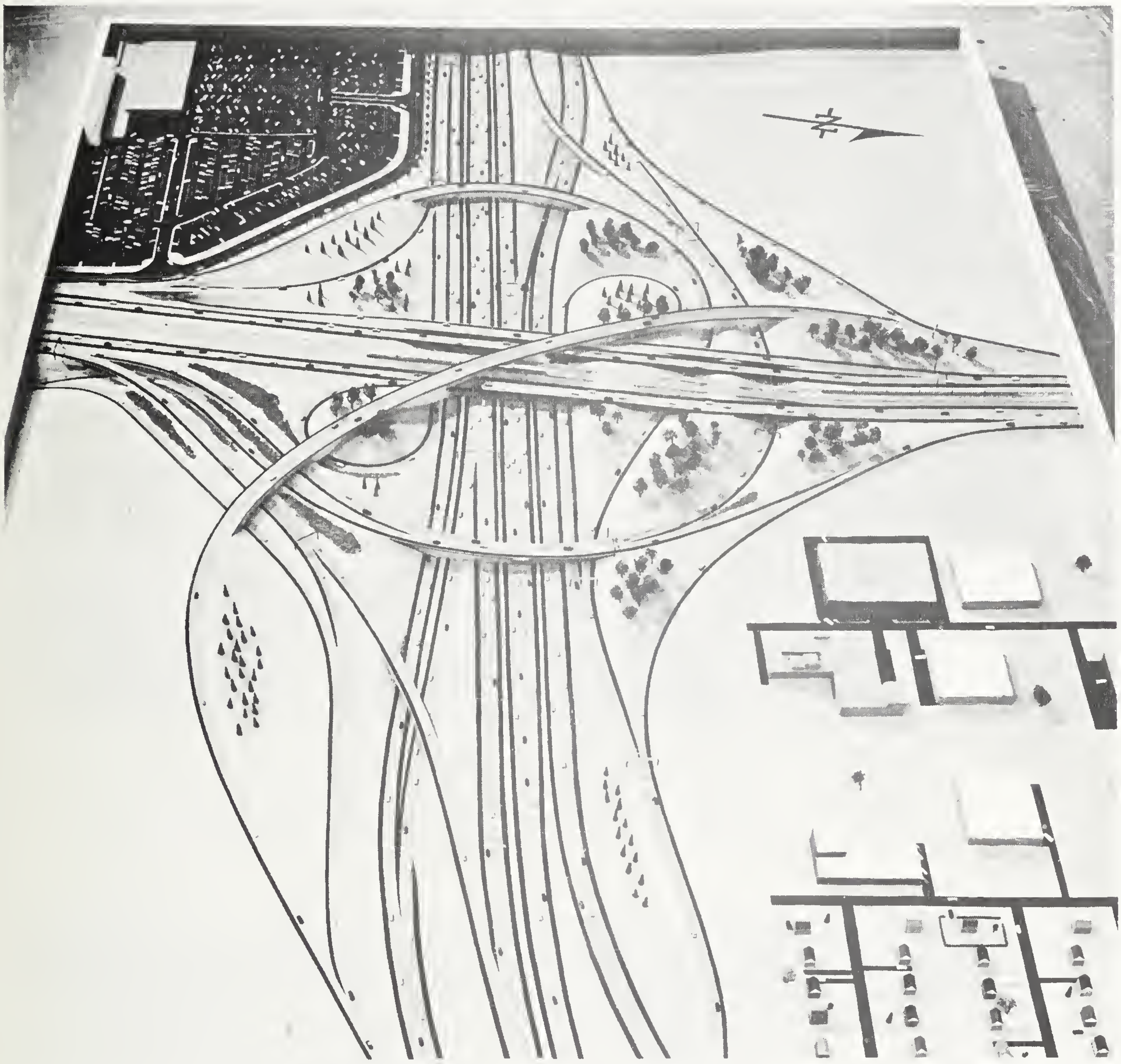
The report recommended that a rapid transit system be constructed in conjunction with the Expressway, studies having indicated the need for this dual facility. A further decision was that commuter parking be provided for 1850 vehicles in the neighborhood of Wilson Avenue.

Because of the Department of Highways' scheduled reconstruction of Highway 401, it was essential that an immediate start be made on the section north from Lawrence Avenue.

The first contract was awarded in September, 1962, and was for the extension of a storm sewer from Ranee Avenue to Highway 401. The sewer was constructed partly in tunnel, with the concrete lining being sprayed into place rather than being formed and placed by conventional methods.

The second contract was awarded three months later, and called for construction of overpasses at Lawrence Avenue and Flemington Road. Both are three-span structures, the deck on the two outer spans at Lawrence Avenue and on all three at Flemington Road being carried by pre-cast, pre-tensioned concrete beams. The beams used at Lawrence Avenue have what is believed to be the heaviest cross-section for pre-cast beams ever used in Ontario for highway structures.

The central spans are over the proposed future rapid transit lines of the T.T.C. The central span and piers of the Lawrence Avenue structure form a rigid frame which will become the roof and walls of the Lawrence Station mezzanine, and were designed in association with the T.T.C. These bridges are scheduled for completion in mid-Summer of 1963.



Proposed Turboleaf Interchange Between Highway 401 and Spadina Expressway, as depicted in model of the Department of Highways, Ontario.

Number of vehicles indicated on roads are representative of the volumes to be expected between 5:00 and 6:00 p.m. in 1980, as determined by Transportation Research Computer Study.

Six Points Interchange - and - Kipling Avenue Overpass - These associated projects, on which construction was commenced in 1960, were both completed well within scheduled time. Their purpose was to alleviate the most intricate traffic situation in the Metropolitan area, inasmuch as they involved the intersection of three main arteries -- Dundas Street, Bloor Street and Kipling Avenue -- or what is colloquially referred to as "Spaghetti Junction".

The engineering features of the structures were detailed in the 1959-60 Biennial Report.

Utility relocation was virtually completed on the Interchange late in 1960, and construction of bridges and retaining walls became a full-scale operation in the Fall and early Winter. The following season, good weather permitted early completion of the extensive grading and paving, and on October 4, 1961, traffic was free to move in all directions.

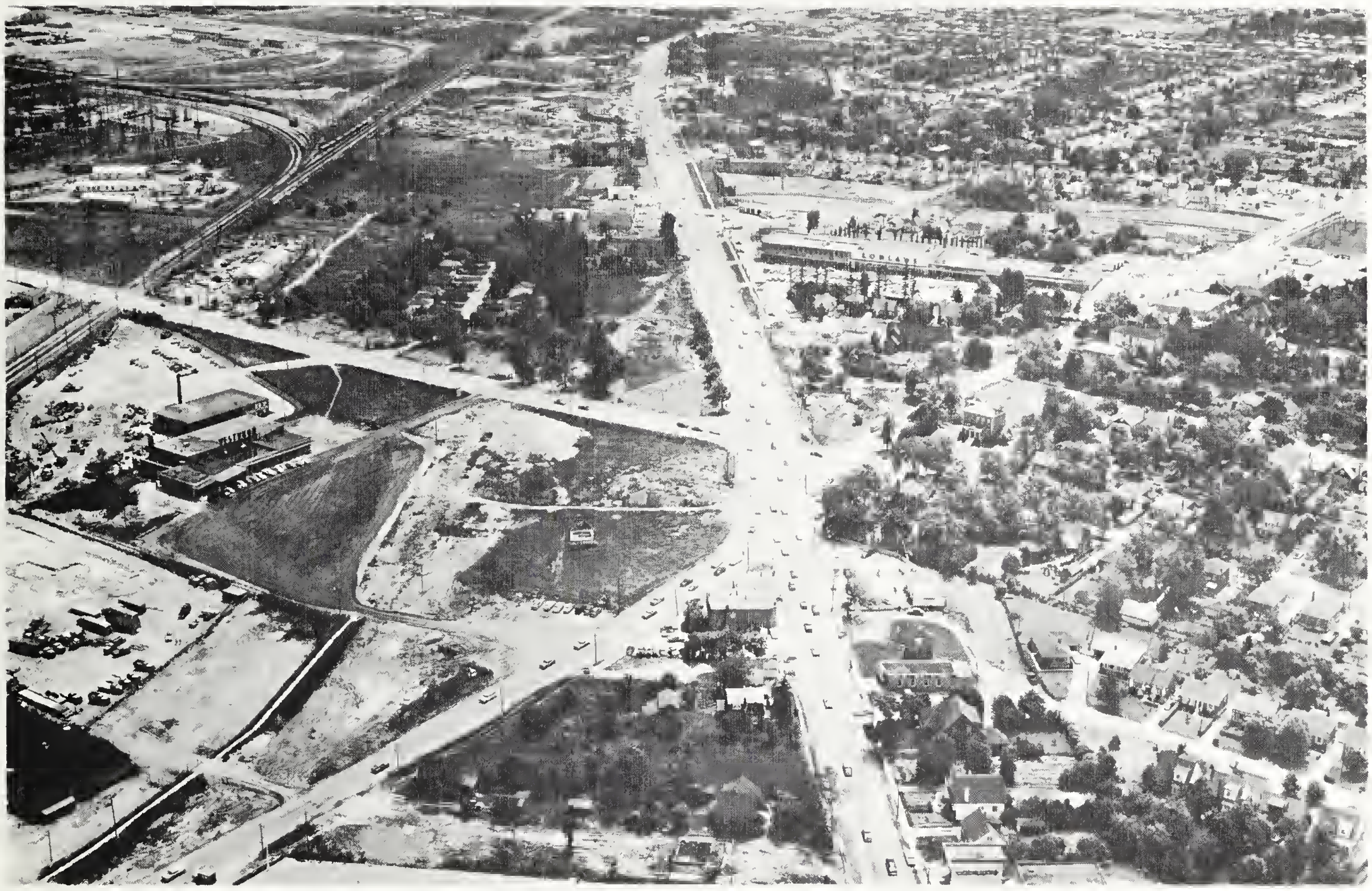
The good construction weather similarly favoured completion, by July 31, 1961, of the Overpass on Kipling Avenue, which is located immediately south of the Six Points Interchange.

A major problem in connection with both contracts was the detouring of traffic, and the maintenance of access to adjacent properties.

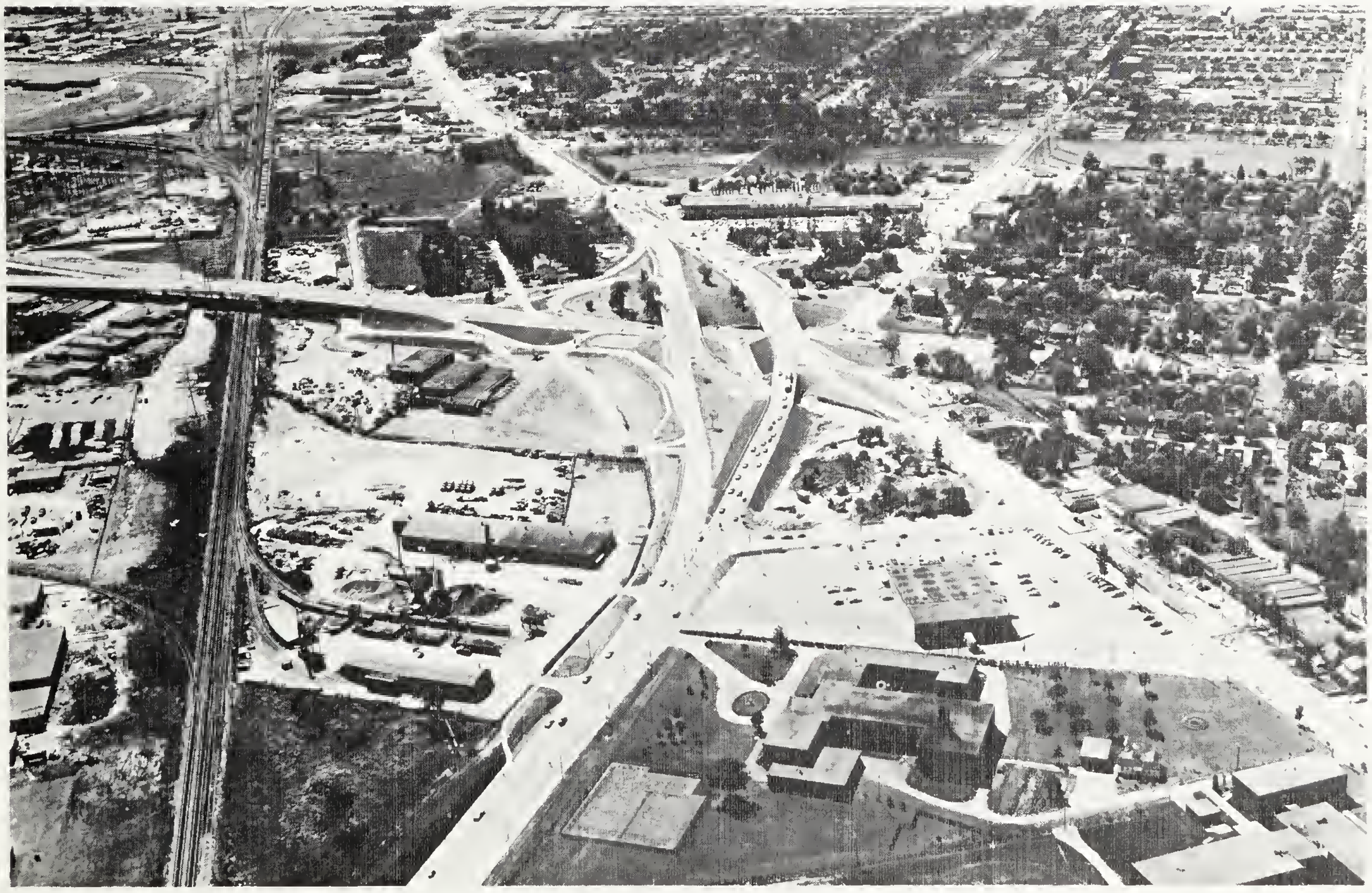
Approximate costs of the Interchange and Overpass were $3,000,000 and $1,200,000, respectively.

Bayview Avenue Bridges and Widening - The major obstacle to the widening of Bayview Avenue was replacement of the obsolete two-lane bridge north of Lawrence Avenue. Decision had been made to reconstruct the existing bridge in the form of a three-lane structure, which would carry south-bound traffic, and erect a parallel bridge which would comprise the north-bound lanes. The latter structure was undertaken first and was completed in late 1960.

The second contract, for replacement of the original bridge, embraced demolition and removal of its steel trusses and deck and for the construction of new steel trusses and deck to carry the south-bound three lanes. The two bridges were then joined.



Six Points Intersection, previous to and following construction of Interchange. Kipling Avenue Overpass is shown at upper left of lower photograph.



Reconstruction of Bayview Avenue, from Blythwood Road to York Mills Road, was carried out concurrently with the bridge construction. The new road is four lanes wide with exception of the section between Lawrence Avenue and Post Road, which is six lanes wide. The additional lane in each direction was necessary because this section is used as an east-west as well as a north-south artery to reach Lawrence Avenue at Leslie Street by way of Post Road and the Bridle Path.

Lawrence Avenue was also widened to four lanes from the east City limit to Bayview Avenue, and Lawrence Avenue was carried on an overpass at Bayview Avenue. Diamond interchange ramps were constructed to provide for movement between these two roads.

Traffic was maintained throughout the entire operation, and in an endeavor to minimize disruption, roadwork was scheduled to be carried out continuously with no Winter shut-down. This was accomplished by the commencement of earth moving in January, 1962, and, by May, when this type of operation is normally commenced, over half of the 100,000 cubic yards of earth in the interchange area had been moved.

The Department installed storm sewers and laid sidewalks for the Township of North York on a work-order basis co-incidentally with this construction.

Rush-hour traffic congestion was relieved with completion of the bridges and roadwork by November 22, 1962, and the entire final cost approximated $2,500,000.

Widened Bayview Avenue

Sections of completed six-lane twin-structure
on Bayview Avenue, over Don River.

(Original Township bridge in foreground.)

Lawrence Avenue East - In the long-range planning of the Department's road program, provision was made for the opening of sections of Lawrence Avenue East, and the improvement of others, so that in reasonable time it would take its appointed place in the system of east-west arteries in the Metropolitan area.

Expenditures on the entire thoroughfare to date have approximated $4,200,000.

In 1960, the 1.7-mile stretch between Don Mills Road and Victoria Park Avenue, which included four bridge structures, was completed, and its potentiality should be fully realized with the opening of the Don Valley Parkway to that point in 1963.

On November 22, 1962, the widened section between the east City limit and Bayview Avenue was placed into operation as an adjunctive work of the Bayview Avenue-Lawrence Avenue Interchange.

Previously, on December 15, 1961, the 2-1/2-mile section between Kennedy Road and Markham Road was completed after a 22-week period of concentrated construction.

A decision to completely close off long sections of the thoroughfare to traffic paid dividends, and having access to the full width of the road permitted construction, at the crest of the work, to progress from one major intersection to another within a week.

Under the Lights on Lawrence Avenue

About 2000 tons of gravel and limestone were placed and compacted by day, and an average of 720 cubic yards of concrete were poured nightly under a powerful lighting plant which had been set up on the site. A portable asphalt plant supplied 600 tons of asphaltic concrete a day to maintain the pace.

Improvement of the intersections with Midland Avenue and Bellamy Road was included in the contract, as were construction of storm and sanitary sewers and sidewalks for the Township of Scarborough.

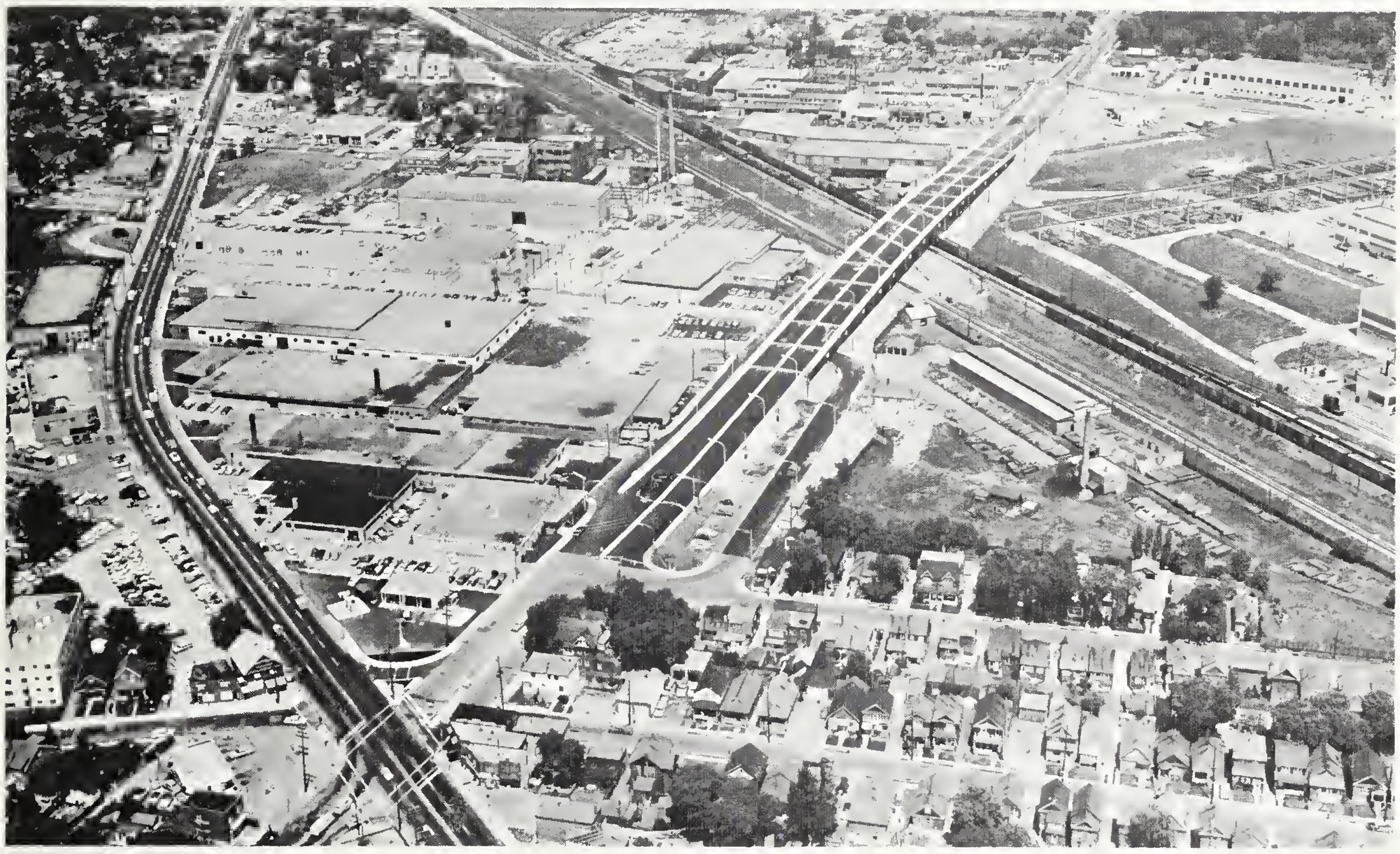
Jane Street Projects - The major grade crossing elimination project undertaken during the two-year period was on Jane Street, south of Trethewey Drive, where a structure was constructed over the tracks of the C.P.R. and C.N.R., which are 140 feet apart.

The overpass, which is 72 feet wide, was laid out on a symmetrical 5% grade. The distance between the abutments is 1003 feet, and the north and south approaches are on compacted fill, with reinforced concrete retaining walls having lengths of 195 and 288 feet, respectively. The overpass is carried on welded steel girders with composite construction. There are 14 spans, 11 of which are square, the other 3 being skewed to cross the railway lines, which are at an angle of 44° with the road. All piers and abutments were constructed of reinforced concrete and supported on spread footings.

Roads were constructed at grade to serve industries located adjacent to the grade separation, and access was obtained by passing underneath the open spans of the structure .

The capital expenditure of the project has been set at $2,000,000, which includes extensive property settlements.

Construction was commenced on August 1, 1961, and a record of some sort was established when the overpass was officially opened to traffic by Mr. William R. Allen, Q.C., Metropolitan Chairman, on June 29, 1962 --- two months ahead of schedule.



Completed Jane Street Grade Separation over C.P.R. and C.N.R.

Jane Street and Wilson Avenue Reconstruction - A contract was awarded and work commenced in October, 1962, to carry out the reconstruction of Jane Street, from Pelmo Crescent to the Black Creek north of Wilson Avenue, and of Wilson Avenue, from Epic Lane to Dallner Road. Only work preliminary to the actual road construction was carried out in 1962 so that traffic would not be disrupted over the Winter months. Utilities were relocated, clearing and grubbing carried out, and a storm sewer installed for the Township of North York. The original Black Creek bridges on Jane Street and Wilson Avenue were demolished at this time, while the Metropolitan Toronto Conservation Authority was diverting the Creek to flow through the new bridges constructed by this Department in 1960. Road construction will commence as soon as weather permits in 1963, and is expected to be completed by mid-Summer at a cost of $500,000.

Dundas Street West Projects - In 1959, the Township of Etobicoke undertook construction of a bridge over Mimico Creek on Islington Avenue, immediately south of its intersection with Dundas Street. The design of this structure depended in part on the final design of the intersection, which was a Metropolitan responsibility, and also on the design for a structure which the Roads Department was scheduled to construct over the Creek on Dundas Street immediately west of the intersection. The logical solution was that the two bridges should be designed simultaneously.

A start was made on the Dundas Street bridge in November, 1961, in order to qualify it under the Winter Works Incentive Program, and it was completed early in May, 1962, at a cost of $235,000.

The structure is unusual in that it is founded on soft, water-bearing strata, liberally peppered with large boulders. The ground was too soft for regular footings and the boulders too numerous to permit the driving of piles. The structure, therefore, was designed as a three-celled box culvert, floating on a base slab several feet below the creek bed. The bottoms of the cells are stone-filled with a concrete lining placed over the stone to carry the strain.

It was originally intended that the widening of Dundas Street between Scarlett Road and the Six Points would be co-ordinated with completion of the Mimico Creek Bridge. However, due to the fact that Dundas Street had been developed irregularly in its early years, there was extreme complication of surveys and it was necessary to obtain a decision from the Master of Land Titles as to the location of street lines before the right-of-way could be acquired.

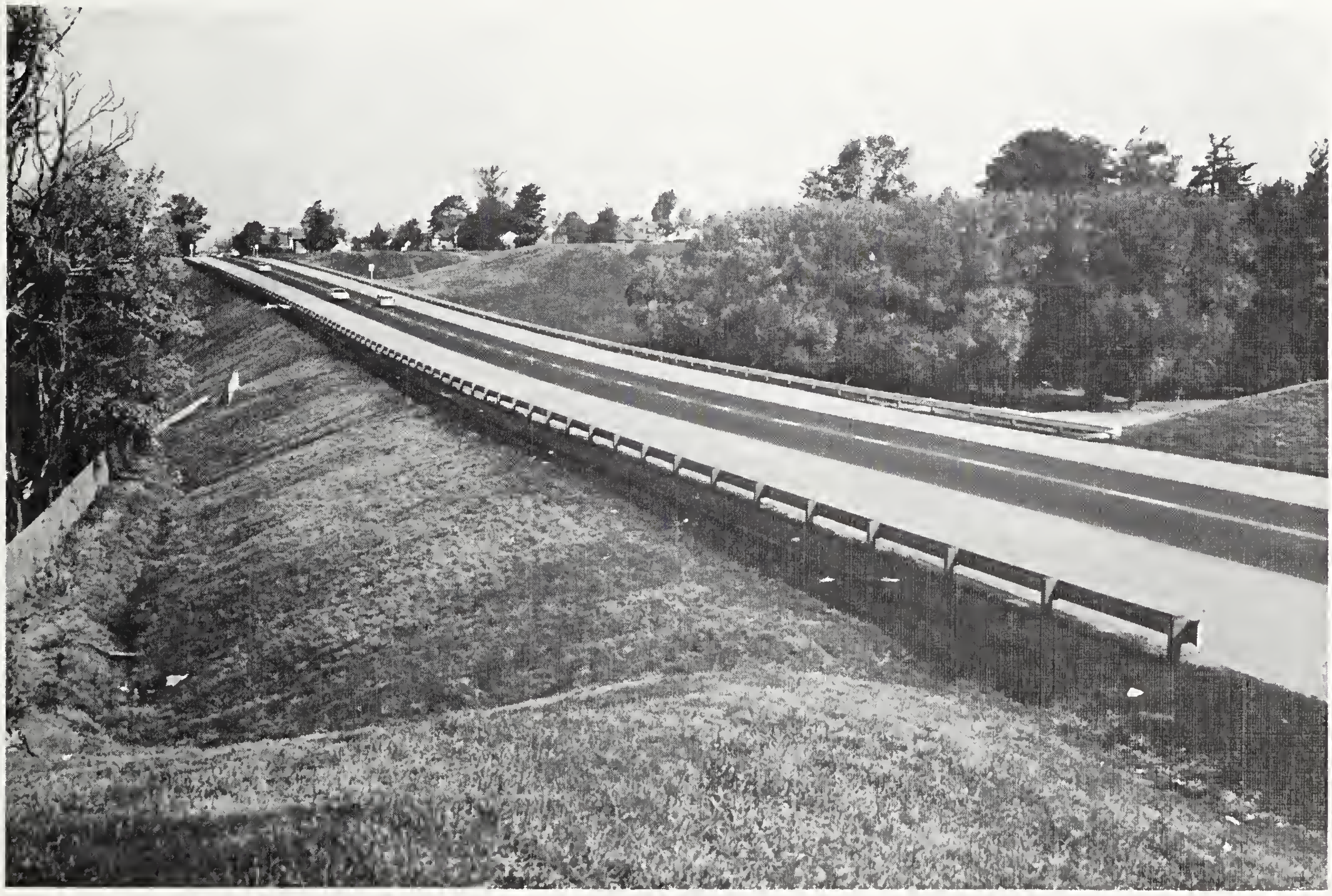
Award of contract was therefore delayed until September 1962. By mid-December, 1962, the road work was completed from Six Points easterly to Chestnut Hills Crescent, including the Islington Avenue intersection. Completion of the final section easterly to Scarlett Road is anticipated by August 31, 1963.

Included in the contract is storm sewer construction for the Township of Etobicoke.

Victoria Park Avenue Extension - In order that north-south traffic capacity in the Scarborough - East York area could be increased, Council, on May 3, 1960, authorized the assumption of Victoria Park Avenue from Kingston Road to O'Connor Drive as a Metropolitan Road. The section of this road from Denton Avenue to Donside Drive through Dentonia Park was unopened.

A contract was called and work commenced on November 6, 1961, to extend Victoria Park Avenue from Donside Drive to Denton Avenue. Included was the construction of a reinforced concrete arch culvert over the Massey Creek -- 19 feet high, 130 feet long, with a span of 46 feet, which was designed within the Department. As well as accommodating the creek, the culvert will provide access between parkland on either side of the road. The road construction involved the moving of 120,000 cubic yards of earth, as the terrain through the park was very rough. Because of the abutting parkland, the side slopes were constructed at a slope of 4:1. The road was constructed with a 75-foot top, but only a 24-foot pavement was laid at this time to provide for the eventual widening of the pavement.

The extension was completed at a cost of $306,000 and opened to traffic August 15, 1962.



Extended Victoria Park Avenue

Eglinton Avenue East - Subway at Bellamy Road - High on the priority of at-grade railway crossings to be eliminated as dictated by road and rail traffic volumes, as well as accident volumes, was the crossing of Eglinton Avenue East at Bellamy Road by the main-line double tracks of the C.N.R. Work was commenced on the construction of a subway at this location in July, 1962, which is designed to accommodate three train tracks and six lanes of vehicular traffic. A pumping station to handle storm water drainage from the subway and the road approaches are scheduled to be constructed in 1963, with the anticipated completion in August.

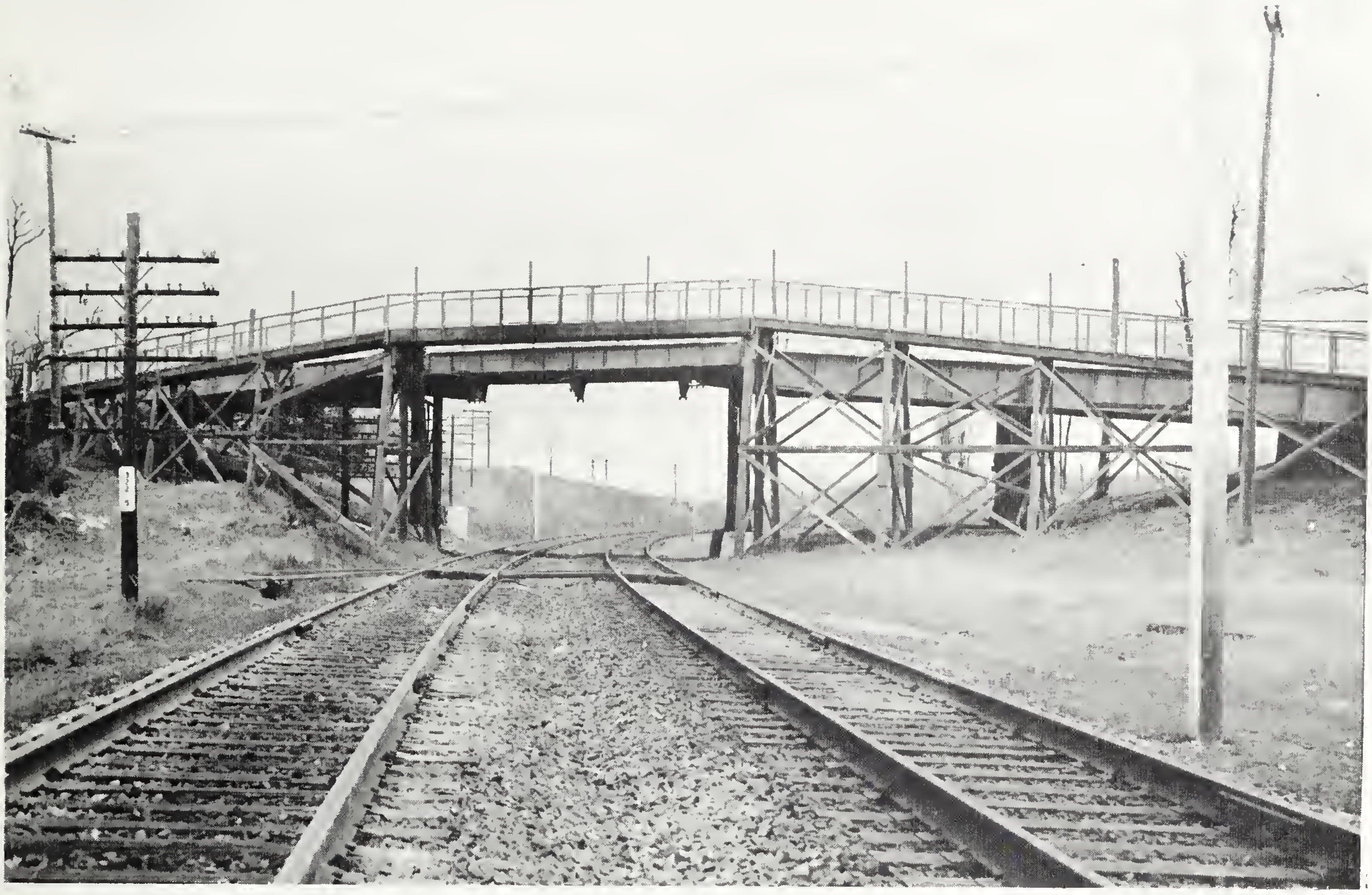
The small skew angle of $23^{\circ}40'$ has necessitated two spans of 134 feet, which are unusually long, and which will contribute to an estimated cost of $1,550,000.

Markham Road Overpass - At the same time as work on Lawrence Avenue East was progressing, reconstruction of the bridge on Markham Road over the C.N.R., north of Eglinton Avenue, was under way.

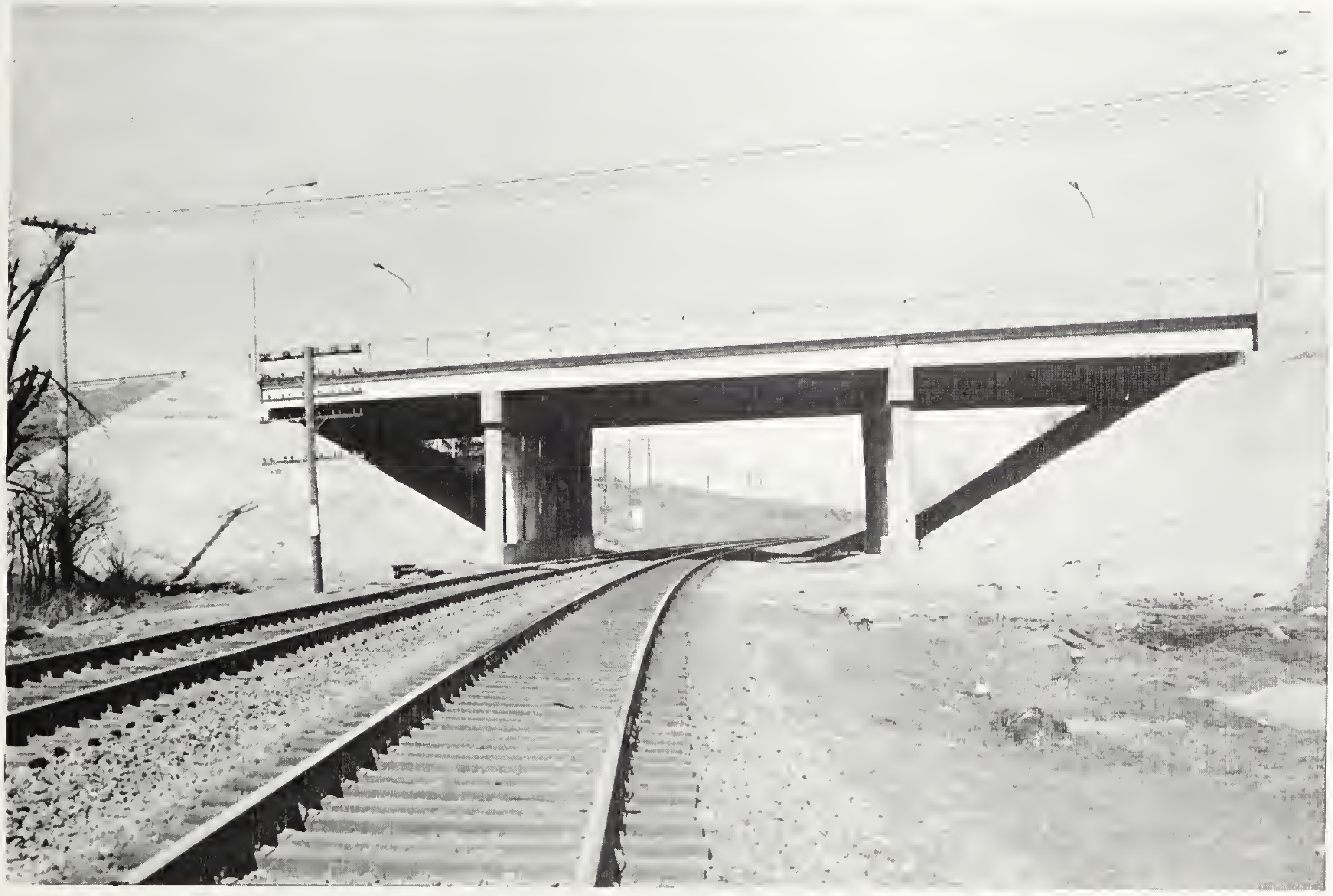
Its priority was advanced so that the efficiency of the widened section of Lawrence Avenue might be utilized. A second reason was that the original wooden, humped-backed structure had been condemned for use by school buses and fire trucks. A third reason was one of economy. Its approaches are over 1300 feet in length, and required considerable fill. It was therefore arranged that as excess material was excavated from the Lawrence Avenue job, it was transported directly to the Markham Road project, placed there and compacted. As much as 2000 cubic yards of earth were thus transferred in a shift.

The overpass was constructed to a length of 138 feet, using long-span prestressed beams. Its width of 92 feet provides for the ultimate six lanes of pavement on Markham Road, and the structure is of a type which can be adjusted, as required, to provide for the Scarborough Extension of the Frederick G. Gardiner Expressway, which will pass to the south of it.

It was opened to traffic by Christmas, 1961, and cost $600,000. This entire project was authorized, designed and constructed in a period of less than a year.



Old and New Structures on Markham Road



Lawrence Avenue West - The construction schedule of the Spadina Expressway made necessary the preparation of an adequate outlet on Lawrence Avenue. It was therefore decided to widen the pavement on this thoroughfare between Dufferin and Bathurst Streets during the 1962 construction season.

The Department initially laid 6000 feet of storm sewer for the Township of North York, as part of the road contract, let in September, 1962. In order to prevent a protracted tie-up of this important artery, a parallel detour route was provided. A tight sixty-day working schedule was then imposed upon the Contractor, and, despite very poor weather conditions during September and October, work was completed a few days ahead of schedule on December 15, 1962.

Work was from dawn to dusk, and on many days continuing into the night. Despite the long hours worked and the disruption caused by entire blocks being completely closed to traffic, the few complaints received is indicative of the willingness of the public to forbear inconvenience when endeavors are made to reduce it to a minimum.

Construction of a subway on Lawrence Avenue, one-half mile east of Keele Street, at the level crossing of the C.N.R. line, was commenced early in 1962. Work is being undertaken by the Railway at the Corporation's expense. The approaches to the structure are being carried out under a separate contract, which includes the widening of Lawrence Avenue to four lanes between Dufferin and Keele Streets. With its completion, Lawrence Avenue will have been completely widened from its westerly extremity at Scarlett Road easterly to Bathurst Street.

This work forms part of a major project to widen Lawrence Avenue across the entire width of Metropolitan Toronto.

Sheppard Avenue East, Kennedy Road and Danforth Road Projects - As construction of the C.P.R. Marshalling Yards in Agincourt neared completion, it was expedient that level crossings on Sheppard Avenue East and Kennedy Road, in the area, be eliminated because of resultant increased rail traffic.

A start was made on August 15, 1962, on construction of a subway on Sheppard Avenue, west of Kennedy Road. The design selected will employ a pre-stressed, hollow-boxed, continuous concrete deck structure, which will be the first of its type to carry rail traffic in North America.

A storm sewer, 1350 feet in length, was primarily laid to drain the subway, and pavement reconstruction and widening to six lanes between Midland Avenue and Brimley Road is being undertaken.

Completion is scheduled for October 1963, and the capital cost has been set at $2,329,000.

Coincidentally, but with an earlier start, May 29, 1962, the grade elimination project on Kennedy Road, south of Sheppard Avenue, also took the form of a subway. It carries a reinforced-concrete continuous slab deck, and is quite simple in design.

Its construction does not present a problem similar to the structure on Sheppard Avenue, inasmuch as it skews Kennedy Road at a 60° angle, whereas the crossing of Sheppard Avenue is at 30°. Also, the latter carries provision for five tracks whereas there will be but three over Kennedy Road.

Opening of the Kennedy Road subway is anticipated in June 1963.

An extensive program has been authorized for Kennedy and Danforth Roads in a total of $5,500,000. This includes widening of road allowances on Danforth Road, from Danforth Avenue to Kennedy Road, and on Kennedy Road, from Danforth Road to Steele's Avenue; construction of the grade separation on Kennedy Road at the C.P.R., and of a bridge over Highland Creek north of Sheppard Avenue.

Reconstruction and widening of 2.85 miles of pavement on Danforth and Kennedy Roads, between Danforth and Eglinton Avenues, was commenced on October 6, 1962, and a little more than two months later, on December 15, was placed into operation.

In order to accelerate the work, sections of the roadway were closed to their entire width, which, in the long run, resulted in less inconvenience to the travelling public. A typical work cycle was one day for excavation, one day for placing gravel base and constructing curbs, one night for paving the concrete base, and two to three days for cure and asphalt overlay.

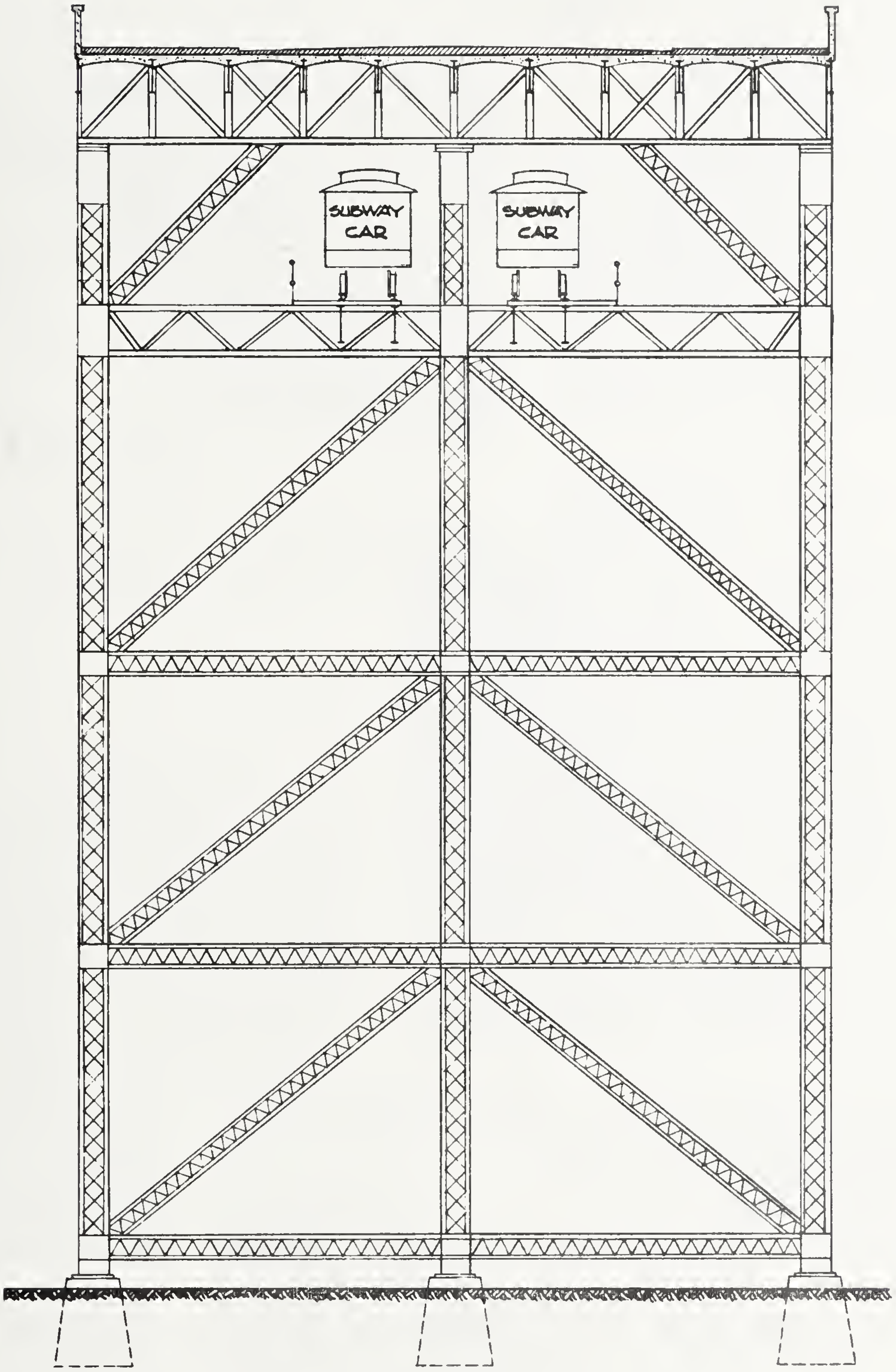
During construction on Danforth Road old timbers were unearthed, and the archives of the Township of Scarborough gave forth the information that these had formed a corduroy road which had been laid in 1799 by Asa Danforth, the first recorded road contractor in the area, and which had been used to transport supplies during the War of 1812.

Prince Edward and Rosedale Viaducts - Replacement of the decks and sidewalk, the repair, where necessary, of steel deck members, and their painting throughout, on the north sides of these viaducts, was commenced on March 14, 1961. Street car operation continued uninterrupted during the work, and traffic was maintained on a restricted basis on the south decks, which had been renovated in 1960. Work was carried out on a shift basis and was completed on June 20. The total cost of the complete repair was just short of $1,000,000.

The second phase of this project is to strengthen the steel trusses and arches of the Prince Edward Viaduct to carry the East-West Subway facility of the Toronto Transit Commission beneath the deck level. An inspection was undertaken in 1962, which indicated that a great proportion of the steel requires only cleaning and painting. It was also reported that some members will require re-examination after scraping of the paint to determine whether or not the steel is in satisfactory condition to carry the loads as is, if some repairs are required, or if steel must be entirely replaced with new members. This work has been authorized for 1963.

The Prince Edward Viaduct was opened in November, 1918, and the incorporation in its design of provision for a lower deck to "accommodate future rapid transit and radial traffic" was originally proposed in a transportation report presented to City Council in 1910.

The third and final phase will be removal of the sections of the decks forming the track allowance on the two viaducts when the street cars are removed following commencement of subway operations.



1910 PROPOSAL FOR BRIDGING OF DANFORTH AVENUE AND BLOOR STREET OVER "THE VALLEY OF THE DON"

(From City of Toronto Archives)

Dundas Street East - Bridge Repair Early in May, 1962, renovation of the Dundas Street East Bridge was commenced. This involved structural changes to accommodate the six lanes of the Don Valley Parkway and replacement of deteriorated steel and spalled concrete.

The original structure consisted of a 50 and 70-foot plate girder span at its west end with identical approach spans at the east, leading to a three-pin steel arch spanning the Don River. River piers and abutments were of mass concrete design.

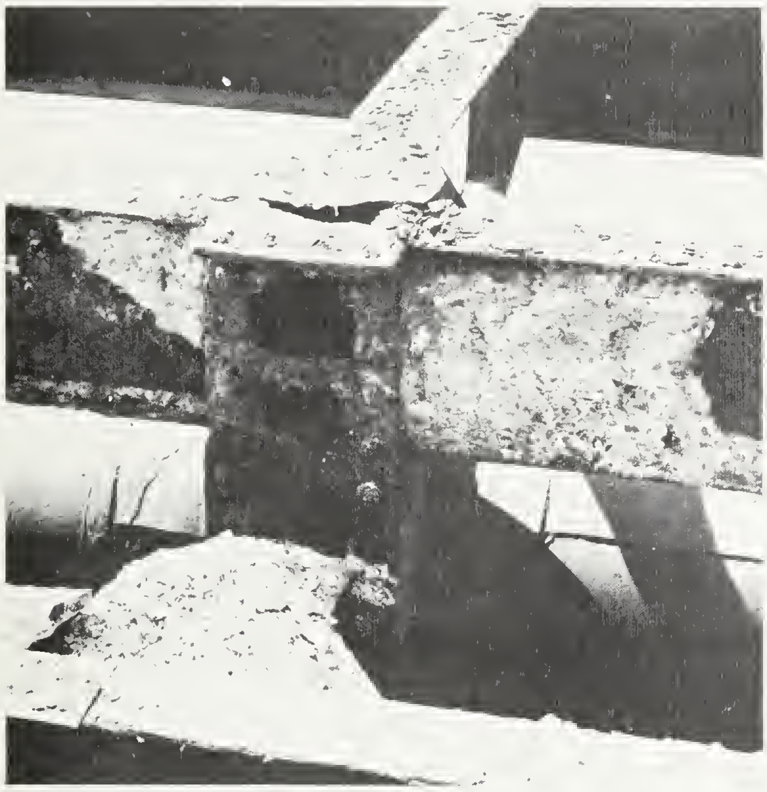
Upon opening the bridge deck it was found that corrosion of structural steel members was quite extensive. This was partially caused by the leaching of saline solution through the bridge deck, but the two west spans, which crossed over the C.N.R. and C.P.R. tracks, were in particularly poor condition because of having been subjected to fumesfrom steam and diesel engines. Deterioration of some concrete was in an advanced stage. The east abutment and wing walls, founded on timber piles, were tilting westwards, and were being propped by the bridge deck.

It was decided to completely remove the two east spans and east abutment and construct a new counterfort abutment supported on 90-foot steel bearing piles. All columns on the arch span required replacement. However, 60 tons of steel removed from the demolished east approach were in sufficiently good condition to be used to replace similar corroded members in the west spans.

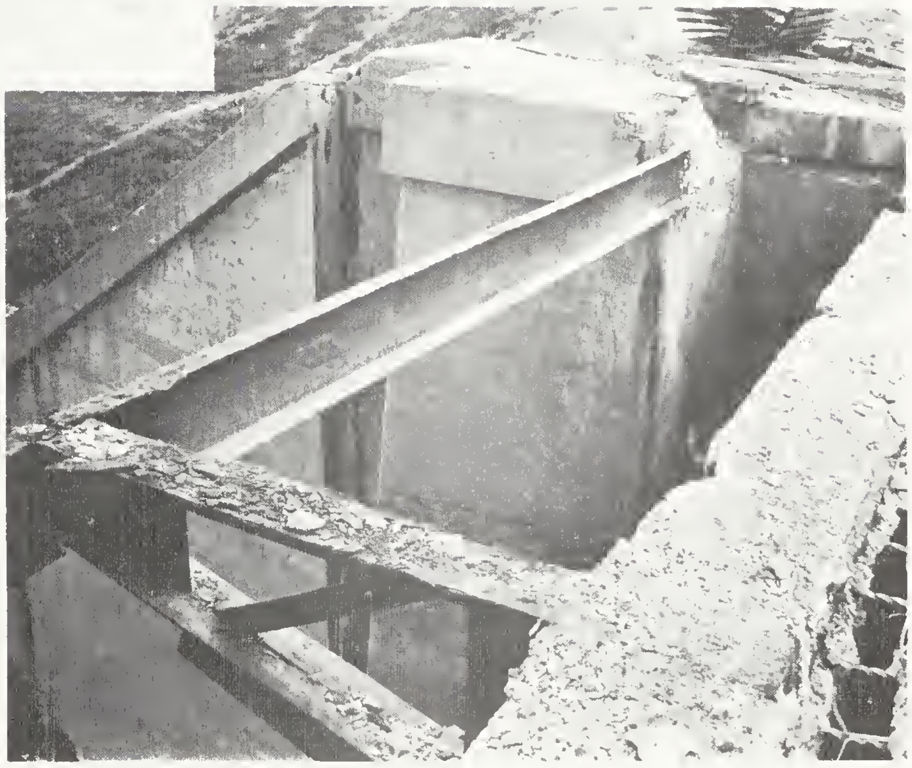
The new deck was laid four feet wider than its original width of 55 feet. Construction joints were sealed with a three-ply application of fiber-glass and hot-mopped asphalt, and the deck was waterproofed with a one-quarter inch layer of rubberized hot mastic asphalt. Aluminum sidewalk railings replaced the cast iron originals. The west abutments and river piers were gunited.

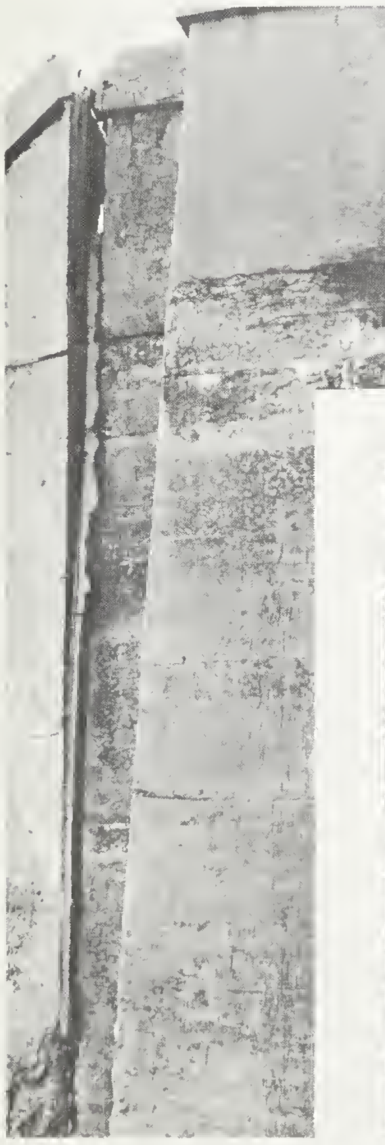
The structure was reopened to motor and street car traffic on November 10, 1962.

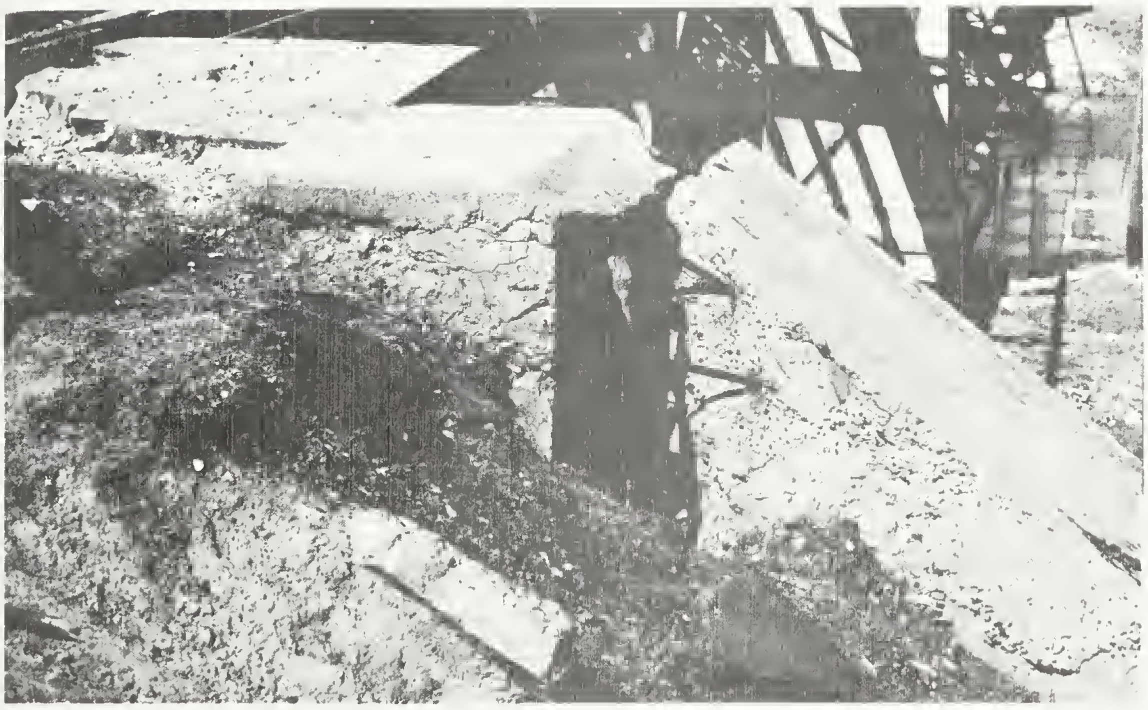
Islington Avenue - With the 1962 assumption as a Metropolitan road of Islington Avenue, between The Queensway and Albion Road, certain improvements which had been scheduled by the Township of Etobicoke were taken over by the Metropolitan Corporation. Widening of the pavement on the one-half mile section between Dixon Road and Lemsford Road was completed on December 8, 1962, and it forms part of a program for this thoroughfare which has been authorized in an amount of $700,000.



SPALLED CONCRETE AND DETERIORATED STEEL - DUNDAS STREET EAST BRIDGE







- MAINTENANCE -

With the lane mileage of the Metropolitan road system having increased by 50% since 1954, there has been a corresponding increased responsibility in the matter of roadway and Winter maintenance.

To cope with this increase, the Department has continued, when it is considered economically advantageous, to engage contractors to undertake such services as cleaning catch-basins, washing guide rails, filling cracks, cleaning ditches and patching pavements, in addition to major road maintenance contracts covering resurfacing, construction of intersectional improvements and Winter services. The cleaning of controlled-access routes is also done under contract.

In line with the policy of using private enterprise wherever possible, the Department's work force has remained constant. In addition, the acquisition of new machinery has been restricted to the replacement of existing equipment. As the flux of work dictates, additional motor vehicles and construction equipment are engaged on an operated basis.

Patrolling of roads, minor repairs to bridges, curbs and pavements, and Winter maintenance on Metropolitan roads within the City of Toronto (with the exception of the Expressway system) are all undertaken by the City's Department of Public Works on a work-order basis. The Metropolitan Parks Department continues to maintain the boulevards and slope areas.

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In February, 1958, execution of an agreement between the Metropolitan Corporation and the Toronto Transit Commission was authorized regarding maintenance of pavements on street-car track allowances, and the ploughing and removal of snow on Metropolitan roads on which street cars, buses and trolley buses are operated in Suburban Area Municipalities. At that date, Metropolitan roads within the City were covered by an agreement between the City of Toronto and the Commission.

This agreement with the City provided for an annual payment to the Commission of $375 per mile of single track, with the Commission maintaining the road surface within the track allowance. With the changing pattern in traffic, it was general opinion that the road authority should assume maintenance of track allowances, and that no payment be made to the Commission.

Accordingly, a second agreement was executed between the Corporation and the Commission, which had effect on January 1, 1962, and which appertained to all Metropolitan roads within the City on which the Commission operates.

The two current agreements -- City and Suburban -- are, therefore, similar in context, and provide that the Corporation is responsible for maintenance of paved track allowances. In the case of any rehabilitation or abandonment of a line by the Commission, the paving cost is on a shared basis.

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The Winter of 1960-61 was characterized by a light snowfall, resulting in a total of 51.3 inches as compared to the 30-year average of 54.9 inches. The total fall during the Winter of 1961-62 was 51.6 inches. The bulk of this, however, came in February, when 30.5 inches fell as compared with a 30-year average of 13.2 inches for the month.

Numbers of maintenance contracts called were as follows:-

	1961	1962
Resurfacing	11	9
Intersectional Improvements	2	2
Bridge Maintenance	2	1
Winter Maintenance	5	5
Cut Repairs	1	1
Yard Buildings	1	1

Permits were granted, as follows, in respect to applications submitted by Area Municipalities and Public Utilities:-

Installation of Services on Roads	1970	1743
Entrance Permits	227	173

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The erection of a new building for Maintenance Yard No. 4 on Lawrence Avenue, east of Kennedy Road, which serves the Scarborough area, was completed in 1961. In 1962, an extension was added to the Service Building in Yard No. 1, Murray Road.

- GENERAL -

Development of Metropolitan Roads System

The Metropolitan Toronto Act required the establishment of a Metropolitan Roads System and provided that the assumption by-law enacted pursuant thereto might be amended from time to time by adding or removing roads from the system. The roads assumed were considered arterial in nature or would likely become part of a major street system by future development. The Statute also made the Corporation responsible for the provision of a system of expressways.

The Draft Official Plan of the Metropolitan Toronto Planning Board, presented in 1960, established that more definite criteria were required to evaluate roads which should be part of the Metropolitan System. Council, therefore, adopted a set of criteria qualifying major arterial roads for eventual assumption as Metropolitan Roads where a given road satisfies at least three of the five criteria established.

These criteria specify that acceptable roads will comprise reasonably direct and unbroken traffic routes, terminating at major arterial streets or connected to expressways.

Parallel roads shall be between one and one and one-quarter miles apart, and should extend across at least two-thirds of Metropolitan Toronto. These roads should extend across the Metropolitan boundary to connect with King's Highways, County or Township concession roads.

Not all of the roads satisfying these criteria presently carry sufficient traffic to justify immediate assumption by the Metropolitan Corporation. It has been the practice to assume such a road when the annual average daily traffic volume on it exceeded 8000 vehicles, or when it constituted a desirable connection of not longer than one and one-half miles between two Metropolitan routes or sections of a route.

The following table indicates changes in mileage of the System. The lane mileage is probably the more significant, since a number of roads which were previously two lanes have been widened to four or six lanes.

Year	Road Mileage	Lane Mileage
Jan. 1, 1954	276.5	780
1958	293.6	930
Dec.31,1962	348.4	1,180

The increased road mileage includes construction of 23 miles of entirely new roads.

Centrally-Controlled Traffic Signal System

Out of a growing realization of the importance of good transportation to economy, and with particular regard for the fact that the full potential of the large capital improvements on the Metropolitan roads system would not be realized unless street efficiency was matched to it, Council, upon the recommendation of Mr. S. Cass, Metropolitan Commissioner of Traffic, in 1958 authorized a small-scale pilot study to examine the practicability of introducing a new traffic signal system which could be centrally controlled through the use of an electronic computer.

One problem to the implementation of such a system was that traffic control authorities were divided amongst the 13 Area Municipalities in varying proportions, and that of the 582 traffic control signals located in the Metropolitan area 439 were located on Metropolitan roads.

The question could be readily solved with the use of a digital computer which could quickly test all possible compromise solutions and determine not only the most desirable settings for individual signals and the time relationships between them, but could also optimise these in such a way as would tend to produce a minimum of delay throughout the system. Such a computer could, with relative ease, develop as many operational schemes for the system as varying traffic conditions might require, but would be only as good as the information on which it was based, which would be in the form of past studies and which would be according to a pre-conceived pattern.

The logical answer was that the computer should collect its own data, process it and place the resultant solution into operation through direct control of the signals, which would result in both the timing of the individual signals and their system relationship being subject to continuous and instantaneous adjustment in accordance with traffic demand.

As a result of the Metropolitan Traffic Engineering Department's pilot study, Council, on October 31, 1961, authorized the introduction of an integrated traffic signal system, controlled directly by a digital computer. Pursuant to this authority, the Ontario Legislature approved the placing of responsibility for all traffic control signals in the area under Metropolitan Toronto jurisdiction, as well as all regulations pertaining to traffic within 100 feet of signalized intersections.

The system, the first phase of which is scheduled to be in operation by August, 1963, will require the installation of a thousand or more vehicle detectors, and the connection of these together with all existing and any future signal installations through leased telephone lines to the computer, which will be located on the main floor of the City Hall.

Apart from the detectors, no special equipment will be required at individual intersections except a small, simple modification unit which, when attached to the existing signal controller, will permit the computer to take over and operate in the same manner as a police officer operating a signal manually. This will also enable the computer to monitor the operation of the signal and will be arranged in such a way that if orders to change are not properly obeyed, or if any equipment failure or other trouble interrupts communications, the affected local controller will immediately revert to its automatic mode of operation.

The detectors will enable the computer to continuously evaluate the traffic demand and instantaneously make adjustment to the signal system. The computer will also consider such things as approach capacity, intersection width and pedestrian requirements, and, after examining each intersection in turn, will determine when the signal should change, by comparing, at any instant, the time for which green has been showing with whatever it decides is the optimum time for the particular movement.

Apart from flexibility in control at individual intersections, the powerful electronic facilities of the computer now in process of manufacture will permit the examination of a thousand or more intersections each second while its memory can relate conditions at one with another.

The system -- created and pioneered by the Metropolitan Traffic Engineering Department -- is expected to effect a 30% improvement in traffic movements. In a comparative sense, it will be the second largest on-line control system known in the World, being exceeded only by the NORAD installation.

Its development has attracted Continent-wide attention, and due recognition was given Mr. Cass when he was presented with the 1962 Research Award of the U.S. Highway Research Board at Washington, D. C.

Mr. Cass showing Research Award Certificate to Metropolitan Chairman.

Transportation Research Program

During the two years embraced by this report, considerable progress was accomplished by the Metropolitan Toronto Planning Board in research, development and testing of its electronic computer traffic prediction model.

Following the test programming, a study of the influence exerted by certain critical factors on travel behaviour characteristics was undertaken, which, in turn, will influence the form of transportation systems. Some of the critical factors studied included the costs of vehicle operation, parking charges, and transit fares. Also studied were the various levels of speed and convenience which can be provided by public transit, as all of these variables will affect a certain percentage of the public in choosing their mode of transportation.

The work carried out emphasized three main aspects of the transportation system planned for Metropolitan Toronto in 1980. These were the necessity for and location of road facilities (particularly expressways), transit facilities (particularly rapid transit lines), and railroad commuter lines.

Procedures established to limit the number of tests and to increase the effectiveness of each test run selected were -

1. The road system will be analysed keeping the transit system and rail commuter line at their committed level of service, or at an acceptable level of service for 1980. These tests will permit selection of an acceptable road system from the service and cost point of view.

2. Using the results of this expressway system analysis, the test series for the transit system will be set up. These tests will incorporate variations in the level of service and hence show the effect upon the other two major facilities.

3. In a similar manner the rail commuter lines will be evaluated.

A work program of testing each of the three major transportation facilities is proposed, realizing that the need for each of these depends, to a large extent, upon the level of service offered by the other types, and from it should emerge an estimate of priorities in construction of facilities.

Property and Park Lands

The following amounts have been paid for the acquisition of properties in connection with the roads construction program:-

	$
1954 to 1960, incl.	17,669,698
1961	5,291,624
1962	6,086,331

The total of $29,047,653 represents approximately 18% of the total capital expenditures for the same nine years. This is a net figure, after recoveries from sale of surplus properties.

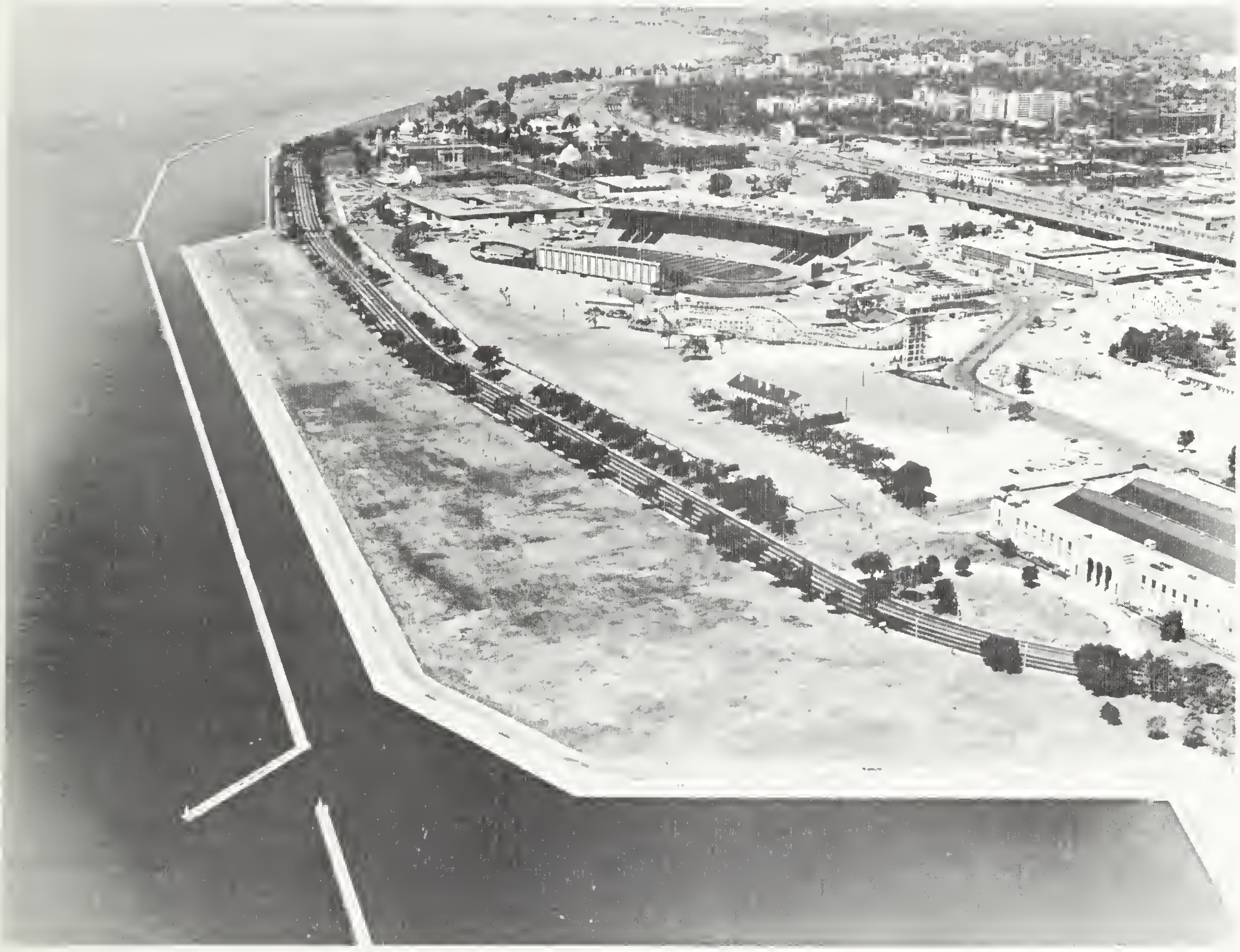
An agreement with the City of Toronto provided that the Metropolitan Corporation would construct a new retaining wall and extend the sewers in front of the Canadian National Exhibition grounds so that additional park lands could be created by fill, and also raise the level of East Riverdale Flats, in consideration for City park lands relinquished for construction of the Frederick G. Gardiner Expressway and the Don Valley Parkway.

The Toronto Harbour Commissioners acted as the Corporation's agent on the C.N.E. project, and the Metropolitan Department of Works undertook the raising operation in Riverdale Park as part of its Land Improvement Schemes program. Both works were virtually completed by the end of 1962.

The Corporation is also obligated to erect eight permanent cubicles under the Expressway to replace services which existed in the Exhibition area, and two of these were completed in 1961. Further commitments are to finally grade, top soil and sod the filled waterfront, relocate Millen Stadium on the East Riverdale Flats, and construct a pedestrian overpass over Royal Drive.

Transportation Technical Advisory Committee

The predecessor of this Committee was established in January, 1957, by Council and was originally named the Roads, Traffic and Planning Technical Committee.



Land fill area of 28.9 acres, created in front of C.N.E. grounds, at cost of $2,500,000.

The function of that Committee was to co-ordinate Roads, Traffic and Transportation Planning Control and to report to the Roads and Traffic Committee on technical matters.

In November, 1962, Council approved a recommendation of the Commissioner of Roads which provided for the change of the name of this Committee, the extension of its scope to include the entire field of transportation within the Metropolitan area, and the inclusion of new members.

The Committee now consists of the Metropolitan Commissioner of Planning, the Metropolitan Commissioner of Roads, the Metropolitan Traffic Engineer, the Planning Engineer of the Department of Highways, Ontario, the Director of Planning of the Toronto Transit Commission, and a representative from the Railway Companies.

Meetings of the Transportation Technical Advisory Committee are held regularly to consider items which have been referred to it by the Metropolitan Transportation Committee, and any which have been placed on the agenda by members of the Technical Advisory Committee or officials of interested government or municipal Departments. When an item concerns an official who is not a member of the Technical Advisory Committee, he is invited to attend the meeting to discuss the matter in question.

The responsibilities of the Metropolitan Transportation Technical Advisory Committee are to:-

1. Study and analyze planning policies and new developments in transportation technologies and practices, and to report its findings to the Metropolitan Toronto Planning Board and, through that Board, to Council.

2. Study technical developments and recommend proposals to the Metropolitan Administration.

3. Co-ordinate appurtenant operations of the Metropolitan Department of Roads, the Metropolitan Traffic Engineering Department, the Metropolitan Toronto Planning Board, the Department of Highways, Ontario, the Toronto Transit Commission, and the Railways.

4. Consult with local municipalities, as appropriate, and provide technical advice to these municipalities when requested.

The Investigation of Corrosion Inhibitors Added to De-Icing Salt

In recent years, sodium chloride, or common rock salt, has become the standard de-icing agent for providing bare pavements during Winter months. A disadvantage of salt is its corrosive effect on motor vehicles. As the use of salt became more widespread, its corrosive effect became more apparent and complaints from automobile owners more frequent and stronger. This created agitation for an additive to salt that would inhibit corrosion.

A few cities in the United States carried out investigations of the various chemical additives which would inhibit corrosion. However, after studying the history of the use of inhibitors in these few cities, it was concluded that the amount of reduction of corrosion by their use had not been satisfactorily determined. The treatment of salt used in Metropolitan Toronto would cost approximately $500,000.00 annually, and it was decided that this expenditure could not be justified by the reported benefits of the use of inhibitors in other cities.

The Roads and Traffic Committee, at its meeting on October 31, 1960, approved the undertaking of a research project to study the effect of an inhibitor on the corrosion of auto body steel by de-icing salt under the direction of the Metropolitan Department of Roads. The Department of Roads requested the Ontario Research Foundation to make the study.

The original plan was to employ vehicles fitted with corrosive panels, operating on portions of unopened roads. This plan was abandoned in favour of special rigs designed to operate on a circular asphalt pad under more controlled conditions. This decision proved wise as the low precipitation pattern would have made road operation difficult. By using the rigs a snowfall could be created daily, at will, by accumulating truck loads of clean snow at the test site whenever a reasonable snowfall occurred in the area. Later in the season, ice scrapings from the various skating rinks were secured, but, finally, in April, water was used on the rig pathways.

The test site was located on Lake Shore Boulevard, east of Jarvis Street, on property acquired for the Frederick G. Gardiner Expressway. Three sets of conditions were established under which corrosion coupons were exposed to the corrosive action of solutions containing: (A) snow only; (B) snow and salt; (C) snow, salt and inhibitor. The inhibitor used was a sodium hexametaphosphate, known as Banox, in the quantity equivalent to 2% of the salt.

Three circular rigs were designed to provide four car wheels each fitted with suitable fenders. Under the fenders three types of coupons were attached so that when the rigs were rotated in the circular pathways, the coupons were exposed to wheel spray of the solutions. The rigs operated one hour per day and travelled a distance of twenty-five miles. One fender of each rig was heated to 40°F during the down period to simulate conditions in a heated garage.

The three types of coupons included a "V" type for crevice corrosion, a flat type, and a special "carette" coupon for a qualitative examination. The crevice and flat type coupons were plastic coated, leaving the inner surface of the crevice coupon exposed and leaving the mid-portion of the flat coupon exposed. The carette coupon was not plastic coated.

The test was begun on February 1, 1961, and was carried through to May 2, 1961. After the first two weeks, coupons were removed every seven days for weight loss determination and evaluation.

In addition to the rig tests, "V" and flat corrosion coupons were attached to a group of automobiles moving over City thoroughfares, exposing the coupons to saline solutions from the de-icing salt used for snow and ice control. This test provided corrosion data under actual road conditions in the City for comparison with data obtained during the rig tests.

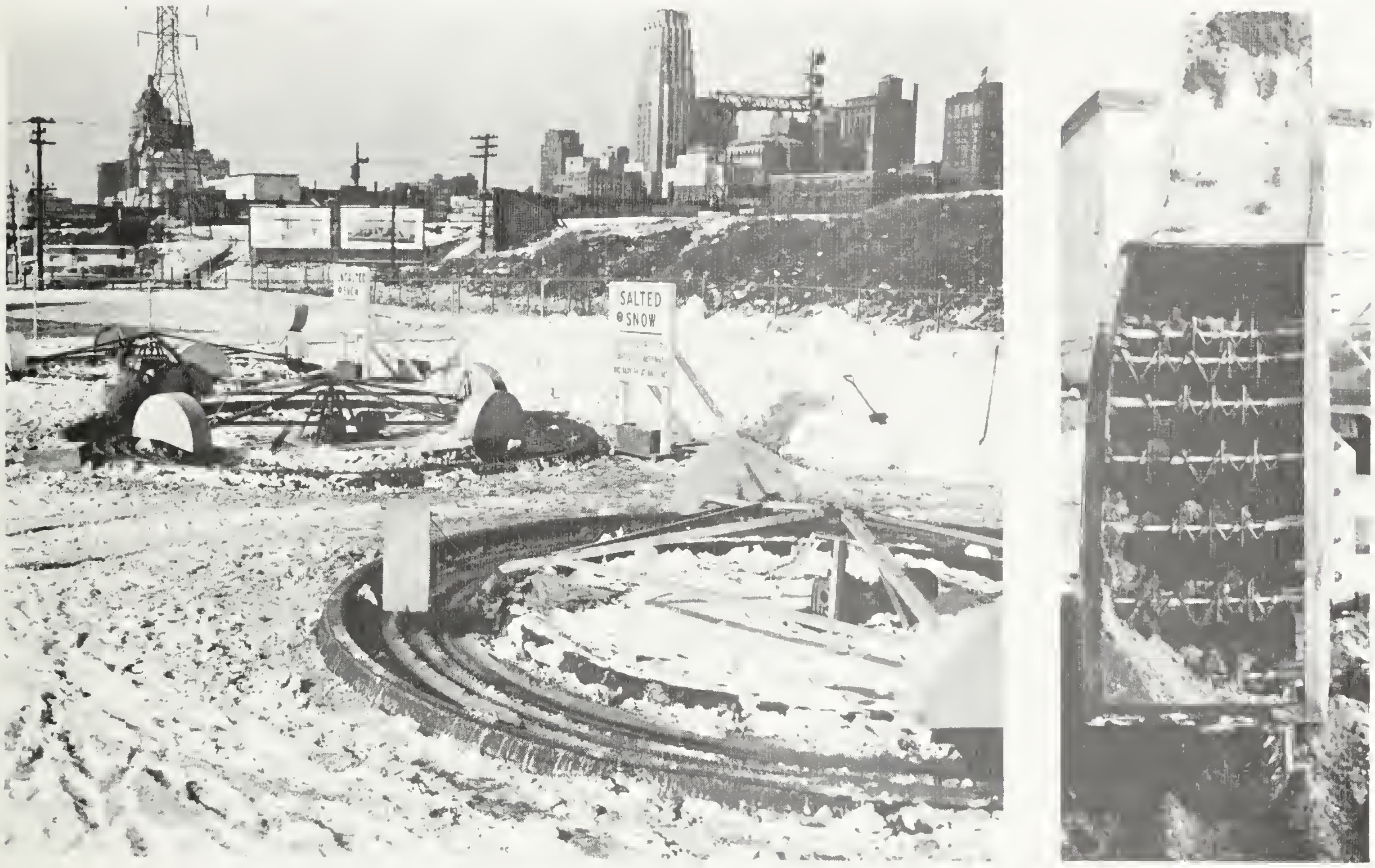
Other work included corrosion testing in the laboratory to examine the inhibiting effect of Banox in the salt spray test, the modified corrodcote test, and the intermittent immersion test. Atmosphere corrosion tests of a short term duration were made at the site of the rig test to evaluate the effect of industrial atmosphere.

Road and rig solutions were tested periodically for salinity, pH value and concentration of Banox inhibitor in the rig solutions.

The following conclusions were contained in the report of the test submitted by the Ontario Research Foundation:-

1) The inhibitor reduced corrosion due to de-icing salts from 10.5% to 77% if all samples were considered. The calculated average reduction of corrosion for all samples was 55.7%.

2) Coupon shape had a major effect on corrosion in unsalted and inhibited salt solutions. Corrosion of crevice type coupons was more severe than for the flat coupons and this was due primarily to the formation and retention of dirt poultices in the crevice coupons. It is felt that this coupon more closely represents automobile conditions.



Three rotary rigs on asphalt pads, and, at right, a wheel with its enclosing fender, showing test coupons.

3) It was shown both by rig test coupons and automobile test coupons that the greatest corrosion rate caused by salt solutions occurs when the car is stored in a heated garage overnight. The efficiency of the inhibitor is also erratic under these conditions and may be negligible.

4) Coupons placed on automobiles in normal use illustrated that corrosion due to de-icing salt is dependent on time and not related to mileage travelled.

The report of the test was considered by the Roads and Traffic Committee at their meeting on October 2, 1961, and the following recommendations by the Commissioner of Roads were concurred in by the Committee:-

(1) There is insufficient justification for an expenditure of this nature. The use of an inhibitor will not eliminate corrosion, only retard that portion caused by salting, and the amount of retardation does not justify the cost.

(2) The problems of corrosion in motor vehicles can be handled more economically and more thoroughly by the automobile manufacturers.

Surveys

Operating within the Department is the Surveys Section, whose function it is to undertake legal surveys of lands to be acquired or sold, the preparation of descriptions of land for legal use in documents relating to property acquisitions, interim payments, sale of surplus lands, expropriation and acquisition of lands, and the issuance of Court orders. Widening and street-line surveys are carried out, as well as those involving topography, cross-sections, road profiles, and on-site engineering surveys for other than Expressways. The services of professional organizations are engaged, as required, to supplement the Departmental staff.

Aerial Surveys - In 1959, the Department of Roads became interested and assisted in the development of a method of aerial surveying of streets through the use of photogrammetry, at a scale of one inch equals 40 feet. A proven method of making such surveys of rural roads had been established, but little had been undertaken in respect to urban areas. Simply expressed, photogrammetry is the science of obtaining measurements by means of photography.

Aerial surveying can complement or assist in many phases of highway engineering work, previously done totally by ordinary ground survey methods. Maps and plans can be rapidly compiled from aerial photographs, which include a wealth of useful detail and which accurately comply with rigid standards.

It has been found that surveying by the use of photogrammetry reduces the cost of producing street plans to about one-third the cost of conventional survey and draughting methods, and in about one-tenth the time. In short, plans can be produced in one year which would normally take ten years, and, with the same amount of money, in one year, nearly three times as many miles of roads can be surveyed. Flying time, however, is restricted to clear days in about twelve weeks a year -- in the Spring after snow and before leaf, and in the Fall after leaf and before snow.

Since the Department's initial work, a number of Canadian cities and towns have proceeded to use this method of surveying for their streets.

Geodetic Bench Mark System - This system had its origin in 1958, when Mr. C. N. Strachan, Commissioner of Works of the Township of Scarborough, convened an informal meeting of local Surveying Authorities to discuss the question of the relationship of his Municipality's system of bench marks to a common system. Out of the meeting arose a proposal to establish a comprehensive system of bench marks to serve as a basis for all surveying and mapping in the Metropolitan Toronto area.

It was a matter which should properly be dealt with at Metropolitan level, and Metropolitan Council, when presented with a recommendation of the Commissioner of Roads, agreed to furnish funds necessary to implement the proposal.

It was arranged to have the precise Levelling Section of the Department of Mines and Technical Surveys, Ottawa, undertake establishment of a dense system of bench marks, which would form a common survey fabric which would express the position and elevation of any point in a simple and direct manner.

The initial step was the creation of a vertical control network, which consisted of the placing of 255 new bench marks, and 40 old ones were tied in to a precise system related to geodetic datum. This was completed in 1960, and from these points local municipalities will be establishing dense systems of bench marks each related to the precise network.

A booklet has been published listing the elevations and locations of these bench marks, and copies have been furnished and are available to all public bodies. A nominal charge is made to private organizations.

Geodetic Co-ordinate System - It was considered desirable to relate the position of physical features, not only in elevation by a common bench mark system, but also in horizontal position by relationship to a co-ordinate or horizontal control system. This is comparable to the familiar navigational reference system consisting of parallels of latitude and meridians of longitude.

The Department of Mines and Technical Surveys also agreed to undertake this project. A reconnaisance crew from its Geodetic Surveys Section came down from Ottawa in 1960 and first determined suitable locations, and in the Summer of 1961 established and triangulated 22 first-order stations.

The focal point of this network is a station set on the roof of the Imperial Oil building on St. Clair Avenue, from where most sections of the Metropolitan area can be observed. Other main points are located atop six prominent buildings, approximately five miles apart. To establish 15 ground stations, Federally-owned geodetic survey towers were temporarily erected.

These towers, which were to a height of 100 feet, are unique in that each has a distinct inner tower on which the ultrasensitive electronic distance-measuring instruments are mounted. One instrument used transmits electronic waves from a base station to another, and a remote transmitter there returns the waves. The elapsed time is easily read at the transmitting end, and readings are translated into miles, feet and inches. The distances measured are to an accuracy of plus or minus two inches.

In the Summer of 1962, a party from the Topographic Section of the Federal Department undertook the second-order traversing between the first-order triangulation stations, and established 230 ground stations in the easterly half of Metropolitan Toronto. The Summer of 1963 should see the placing of the final 200 stations in the westerly half.

All data will then be taken to Ottawa, where the geodetic values of the stations will be calculated on an electronic computer. Results will be expressed in latitudes and longitudes given for each station to four decimal places of a second. Values will then be calculated for each station in a plane co-ordinate network.

Finally, by using electronic survey equipment and these survey monuments, all future surveys will automatically be related, thereby co-ordinating all engineering, surveying and mapping projects in the Metropolitan area.

In an over-all sense, the projects will culminate in tremendous savings. They will, for instance, provide immediate ground control for aerial surveys and through the medium of photogrammetry furnish qualitative information and data for topographic mapping.

This project has been under the direction of Mr. J. E. Lilly, Dominion Geodesist, and Mr. A. C. Tuttle, Chief Topographical Engineer, with Mr. R. A. Smith, Supervisor of Surveys of the Department of Roads, working in association.

The equipment used is that of the Department of Mines and Technical Surveys, who bear the cost of the living expenses of their staff while in the Metropolitan area, as well as their salaries.

A point of interest is that the Cities of Montreal, Hamilton, Regina, Saskatoon, Moose Jaw and Calgary, have requested the Department of Mines and Technical Surveys to undertake similar projects.

Renaming and Renumbering of Streets

The Metropolitan Toronto Act provides that the Corporation may change street names where there is any conflict. There have been a few such changes, but a major one was completed in 1962 when Lake Shore Road, from the Humber River to Etobicoke Creek, was renamed Lake Shore Boulevard West.

The reason behind the change was that a direct thoroughfare from the centre of the City of Toronto to its westerly boundary was named Lake Shore Boulevard West and its continuation through the municipalities of Etobicoke, Mimico, New Toronto and Long Branch was known as Lake Shore Road and had certain duplications in street numbers. The Canada Post Office was experiencing difficulties in mail deliveries, and the change was at their instigation.

The effect was that Lake Shore Boulevard West became a continuously-numbered street from the centre of the Metropolitan area to its westerly limit.

One problem to the renumbering was that, because the thoroughfare closely paralleled the Lake, buildings set back as far as 600 feet from Lake Shore Road were numbered on it.

To overcome some of the difficulties, an aerial survey was first made of the area, and a plan with a scale of 40 feet to the inch was produced on which all buildings and entrances were accurately plotted. With the plan in hand, a field crew noted on it all information regarding the existing 1,037 buildings which were to be renumbered.

The annotated plan was then brought into the office, scaled into slots, and, having regard for redevelopment, a constant series of numbers was assigned to each. Property owners were then given eight months' notice of their new numbers.

A point of interest is that each renaming and renumbering operation requires that a complete list of the changes be furnished about 300 organizations.

Lighting

In the development of the Expressway system there has been a consequent concentration on highway lighting. Constant improvements are being made in this field, and it follows that the Department is keeping abreast of them.

Fluorescent lighting has been established as the standard for the following reasons:-

1. Less glare
2. Efficient use of electrical power
3. Natural color
4. Less frequency of maintenance, due, mainly, to longer lamp life.

Two systems of fluorescent lighting have been adopted -- the conventional overhead and railight.

The overhead lights are mounted on aluminum or spun-concrete poles, all with aluminum davit-type brackets. These were chosen for their strength, long life, the maintenance factor and aesthetic features.

Railight has been adopted for use in special locations, such as the on and off ramps of the Frederick G. Gardiner Expressway at Spadina Avenue. The light strip is practically continuous, the glare is completely eliminated, and light on the roadway is quite uniform and effective. Railight also acts as a guide to the driver in delineating the ramps, particularly in foggy weather.

Railight installation.

Ramp Heating

Some thought was given to the melting of snow on Expressway ramps, and it was decided that the Department would conduct experiments under actual conditions. The following methods were considered:-

Electrical heating grids under the driving surface.
Radiant heating using an anti-freeze solution.
Infra-red heating.
Direct hot-air heating.

Electrical heating was selected as being the most dependable and easily-operated. During the Winters of 1961-2 and 1962-3 tests were carried out on two ramps of the Frederick G. Gardiner Expressway at Spadina Avenue to decide upon the feasibility of the scheme and details of design.

Results of these experiments have clearly indicated that technically it is possible to keep ramps clear of snow and ice by embedding steel-mesh grids in the asphalt pavement. However, the economics of the system require to be evaluated, as results of the experiment have not been fully assessed.

Sign Regulations

Council, on May 29, 1962, repealed the requirement of filing a bond to indemnify the Metropolitan Corporation against any damage which might be caused by an overhanging sign. There had never been occasion to make a claim under any of these bonds, and it was felt that while The Municipal Act makes the Corporation liable for any want of repair of a highway which might result from the construction, maintenance and use of any such sign, it specifically gave a remedy over against the person whose act or omission caused the want of repair. All existing bonds were forthwith cancelled.

As 1962 closed, consideration was being given to enactment of a by-law which would prohibit the erection or display of any sign, billboard or advertising device within 150 feet of controlled access roads or expressways, with the exception of signs advertising the property on which they are erected for sale or signs erected on commercial buildings identifying or advertising ownership or products of the owners or occupants of such buildings.

J. D. GEORGE, P.ENG.
CHAIRMAN

COL. F. S. McPHERSON
SECRETARY

METROPOLITAN TORONTO PUBLIC UTILITIES CO-ORDINATING COMMITTEE

MEMBERS
BELL TELEPHONE CO.
CITY OF TORONTO
CONSUMERS' GAS CO.
EAST YORK TOWNSHIP
EAST YORK HYDRO
ETOBICOKE TOWNSHIP
ETOBICOKE HYDRO
FOREST HILL
LEASIDE
LONG BRANCH
METROPOLITAN TORONTO ROADS DEPT.
METROPOLITAN TORONTO WORKS DEPT.
MIMICO
NEW TORONTO
NEW TORONTO P U.C.
NORTH YORK TOWNSHIP
NORTH YORK HYDRO
ONTARIO HYDRO
SCARBOROUGH TOWNSHIP
SCARBOROUGH P.U.C.
SWANSEA
TORONTO HYDRO
TORONTO TRANSIT COMMISSION
WESTON
WESTON P.U.C.
YORK TOWNSHIP
YORK TWP. HYDRO

The MTPUCC continues to operate actively in its appointed role of dealing with problems incidental to the co-ordination of planning, construction and maintenance of utilities, and the progress made in the most recent two years of its nine-year existence can be attributed to the interest shown by its representative members.

Possibly the most significant item on the Committee's agenda was a brief presented to the Select Committee of the Province of Ontario dealing with The Municipal Act and related Acts, in which representation was made for legislation which, through planning, would provide for better accommodation for utilities in road allowances on existing as well as new thoroughfares.

One of the major functions of the Committee, of course, is the production of plans on which are plotted existing underground services, and which provide the information necessary for the planning and budgeting of space for future services. Close to 900 of these plans have been prepared to date, and their production is being continued at a pace commensurate with the availability of funds. The Committee's scope does not pertain to Metropolitan roads alone, but to every thoroughfare in the Suburban Area Municipalities. Preparation of plans of City of Toronto streets has been carried out for some years under jurisdiction of the City of Toronto PUCC.

The conflict of trees and their roots with utility installations has been a point of issue through time between Arborists and Engineers. The question found its way into the Committee, and, after an exchange of views, it was agreed that tree-planting and utility installations would be co-ordinated. Varieties of trees are to be planted which will least interfere with utilities, and to further cement relations the Arborists now have representation on the Committee.

The Committee was approached by the Public Works Services Branch of the Emergency Measures Organization to assist in arranging a program of training of senior personnel of Operating Departments and Utilities in the Metropolitan Area. A series of lectures has been undertaken and is continuing.

A number of Sub-Committees have been set up and are active in consideration of the subjects implied in their following titles:-

1. Ideal Locations
2. Financial Matters
3. Personnel Safety
4. Utilities Safety
5. Hydro Transformer Vaults
6. Road Widening
7. Road Cuts
8. Preservation of Trees
9. Co-ordination with Metropolitan Planning Area.

Industrial and technical developments of recent years are making it necessary for utilities to be placed underground. Telephone and Hydro wires, which have been mostly overhead, are now gradually being buried. This is safer, of course, from the utilities standpoint, and aesthetically desirable for the community. One deterring factor is that it still costs considerably more to place a line underground than to carry it the same distance overhead.

Due to a shortage of space under streets in many developed areas, a severe congestion of utilities exists and the necessary minimum clearances are not available. To improve this situation, the Committee has made recommendations to local Councils as well as the Government of Ontario.

A gratifying point is the interest indicated by other Cities and Towns in the endeavors of the Committee, and, on occasions, their representatives attend the regular meetings.

Another point meriting mention is the continuing interest in the Committee shown by Col. F. S. McPherson and Mr. O. M. Falls, two original members who are retired from active engineering practice, and who, respectively, held the posts of Supervisor of Rights-of-Way of The Bell Telephone Company and Commissioner of Works of the Township of York.

Department of Highways, Ontario - Board of Transport Commissioners for Canada

The Metropolitan Corporation continues to receive a subsidy from the Department of Highways, Ontario, of 50% on eligible expenditures related to roads construction and maintenance, and Officials of that Department maintain their usual close liaison with the Department of Roads in all matters common to the two authorities.

A feature of this relationship are the monthly meetings convened by the District Municipal Engineer of the Department, which are attended by their Auditors and the Commissioner of Roads and members of his staff, at which the subject of subsidies is given a thorough airing. Any questions which have arisen are given prompt consideration, and it has all had the effect of expediting subsidy payments.

The Board of Transport Commissioners for Canada also continue their contributions through the Railway Grade Crossing Elimination Fund. These provide for 80% of the construction costs, to a limit of $500,000, of a new structure to eliminate a level grade crossing, and 50% of the cost, with a limit of $250,000, in the case of reconstruction or improvement of an existing grade separation. The Railways concerned also contribute to the cost of such structures; in each case according to the relevant Order of the Commissioners.

As a point of interest, the following statement is appended which summarizes expenditures of the Department of Roads since its inception on January 1, 1954, through to December 31, 1962, and subsidies and contributions received:-

	$	$
Gross Expenditures:		
Capital	153,588,009	
Current	42,744,923	
On account of Works which Area Municipalities had in progress on December 31, 1953, and which were assumed by the Metropolitan Corporation	5,723,353	202,056,285
Subsidies and Contributions:		
Province of Ontario - Statutory Grants	93,646,956	
Government of Canada - Railway Grade Crossing Elimination Fund	5,251,927	
Canadian National Railways	150,409	
Canadian Pacific Railway Company	384,308	
Area Municipalities	761,570	
Toronto Transit Commission	181,360	
Winter Works Incentive Program	26,498	100,403,028
Net Expenditure		101,653,257

- SUMMARIES -

WORKS UNDERTAKEN
EXPENDITURES
CONTRACTS AWARDED

- WORKS UNDERTAKEN -

The schedule of works completed in 1961 and 1962 is as follows:

ELEVATED STRUCTURE

1962

		Mileage
Frederick G. Gardiner Expressway	West of Dufferin Gates, C.N.E., to Spadina Avenue	1.39
	Spadina Avenue to Rees Street	.30

STRUCTURES

1961

Bloor-Dundas Streets Interchange	West-bound overpass at Kipling Avenue
- do. -	West-bound overpass at Dundas Street
Don Valley Parkway	Grenoble Drive, over Don Valley Parkway
- do. -	Pedestrian underpass at relocated C.N.R. tracks south of Lawrence Avenue
"	Subway under C.N.R., north of Eglinton Avenue (constructed by C.N.R. at expense of Metropolitan Corporation)
Kipling Avenue	Overpass at C.P.R., south of Bloor Street
Markham Road	Overpass at C.N.R., north of Eglinton Avenue

1962

Bayview Avenue	Bridge over Don River, north of Lawrence Avenue (south-bound)
Don Valley Parkway	Bridge over Don River, north of Lawrence Avenue
- do. -	Pedestrian underpass, Don Valley Parkway, south of Lawrence Avenue
Dundas Street West	Bridge over Mimico Creek
Jane Street	Overpass at C.P.R. and C.N.R., south of Trethewey Drive
Lawrence Avenue East	Interchange with Bayview Avenue
Victoria Park Avenue	Arch culvert at Massey Creek

NEW ROADS

1961

		Mileage
Don Valley Parkway	Royal Drive to Eglinton Avenue	5.25

1962

Victoria Park Avenue	Denton Avenue to Donside Drive	.50

PAVEMENT WIDENINGS

1961

Jane Street	John Best Avenue to Pelmo Crescent	.80
Lake Shore Boulevard West	East-bound and west-bound from Bathurst Street to C.N.R. "Piggy-Back" Terminal	.30

cont'd .....

		Mileage
Lawrence Avenue East	Kennedy Road to Markham Road	2.75
Lawrence Avenue West	Keele Street to Jane Street	1.20
- do. -	Martini Drive to Ralph Street	.50
Markham Road	Eglinton Avenue to C.N.R.	.50

1962

Bayview Avenue	Blythwood Road to York Mills Road	2.10
Danforth Road	Danforth Avenue to Kennedy Road	1.69
Dundas Street West	Six Points Interchange to Chestnut Hills	.68
Islington Avenue	Dixon Road to Lemsford Road	.53
Kennedy Road	Danforth Road to Eglinton Avenue	1.16
Lawrence Avenue East	City Limit to Bayview Avenue	.45
Lawrence Avenue West	Dufferin Street to Bathurst Street	.84

RESURFACING OF PAVEMENTS

1961

Bloor Street	Oakmount Road to Kennedy Avenue	.75
Danforth Avenue	Jones Avenue to Woodbine Avenue	1.50
- do. -	Main Street to Dawes Road	.25
Dixon Road	Highway 27 to Indian Line	.50
Dundas Street West	St. John's Place to Jane Street	.75
Dupont Street	Christie Street to Ossington Avenue.	.50
Eglinton Avenue East	Mt. Pleasant Road to Bayview Avenue.	.50
- do. -	Warden Avenue to Birchmount Avenue	.50
Keele Street	Rogers Road to Eglinton Avenue West.	.75
Kipling Avenue	Highway 401 to Rexdale Boulevard	.75
Lake Shore Boulevard West	Fifth Street to Twenty-Third Street.	1.00
Richview Side Road	Islington Avenue to Highway 27	2.00
Sheppard Avenue East	Kennedy Road to Brimley Road	1.00
South Kingsway	Bloor Street to The Queensway	1.25

1962

Dundas Street	Parliament Street to Don River	.50
Dupont Street	Campbell Avenue to Dundas Street	.38
Eglinton Avenue West	Kane Avenue to Bicknell Avenue	.36
Frederick G. Gardiner Expressway	Humber River to Jameson Avenue	2.08
Islington Avenue	Barker Avenue to Albion Road	.56
Kingston Road	Woodbine Avenue to Victoria Park Avenue	1.33
Lake Shore Boulevard West	Miles Road to First Avenue	.70
Richview Side Road	Islington Avenue to Scarlett Road	1.37
Spadina Avenue	College Street to Richmond Street	.72
Trethewey Drive	Jane Street to Eglinton Avenue West.	1.51
Weston Road	St. Clair Avenue West to Northland Road	.57

INTERSECTIONAL IMPROVEMENTS

1961

Albion Road, at Islington Avenue
Bathurst Street, at Eglinton Avenue
    - do. - at St. Clair Avenue
    " north of Sheppard Avenue
Bayview Avenue, at Sheppard Avenue
Danforth Avenue, at Birchmount Road
    - do. - from Kelvin Avenue to Luttrell Avenue
Danforth Road, at Birchmount Road
    - do. - at Warden Avenue
Don Mills Road, at Lawrence Avenue
Eglinton Avenue, at Danforth Road
Keele Street, at Keelesgate Drive
Kennedy Road, at Ellesmere Road
    - do. - at Sheppard Avenue
Kingston Road, at Lawrence Avenue
    - do. - at Old Kingston Road
    " at Celeste Drive
Kipling Avenue, at Horner Avenue
    - do. - at Rexdale Boulevard
Lawrence Avenue West, at Marlee Avenue
Mt. Pleasant Road, at Eglinton Avenue
Pape Avenue, at Donlands Avenue
Rosedale Valley Road, at Bayview Avenue
Royal York Road, at The Queensway
Sheppard Avenue, at Yonge Street
Vaughan Road, at Northcliffe Boulevard
Weston Road, at Albion Road
Wilson Heights Boulevard, at Sheppard Avenue
Woodbine Avenue, at York Mills Road
Yonge Street, at Church Street

1962

Lake Shore Boulevard East, at Carlaw Avenue
Laird Drive, at Millwood Road
Eglinton Avenue West, at King George Drive
Bathurst Street, at Lawrence Avenue
Mt. Pleasant Road, at Whitehall Road
Dixon Road, at Riverview Heights
Wilson Avenue, at Clayson Road
Keele Street, at Sheppard Avenue
St. Clair Avenue East, at Midland Avenue
Lawrence Avenue East, at Warden Avenue
Lawrence Avenue East, at Victoria Park Avenue
Lawrence Avenue East, at Pharmacy Avenue
Keele Street, at Calvington Drive
Kipling Avenue, at Dixon Side Road
Kingston Road, at Brimley Road
Leslie Street, at York Mills Road
Leslie Street, at Sheppard Avenue
South Kingsway, at Riverside Drive

MAJOR REPAIRS TO BRIDGES

1961

Bloor Street	Prince Edward and Rosedale Viaducts
Old Weston Road	Over C.P.R., at West Toronto Station
Spadina Avenue	Over C.N.R., south of Front Street

1962

Dundas Street East	Over Don River

- SUMMARY -

Works Completed	1961	1962
Elevated Structure	-	1.69 miles
Bridge Structures	8	7
New Roads	5.25 miles	0.50 "
Pavement Widenings	6.05 "	7.45 "
Resurfacing of Pavements	12.00 "	10.08 "
Intersectional Improvements	30	18
Major Repairs to Bridges	3	1

Works Under Construction, December 31, 1962	
Elevated Structure	1.60 miles
Bridge Structures	9
Pavement Widenings	3.78 "
New Roads	3.88 "

- Compiled by Miss H. M. Meyrick

- SUMMARY OF EXPENDITURES -

Capital Projects	1961 $	1962 $
Avenue Road - Pavement Widening and Subway;		
Bloor Street to St. Clair Avenue	388,912	101,355
Bathurst Street - Pavement Widening;		
Sheppard Avenue to Steele's Avenue	2,909	16,201
Bayview Avenue - Pavement Widening, Bridges at Don River, Lawrence Avenue Interchange;		
Blythwood Road to Steele's Avenue	318,876	1,886,568
Bloor and Dundas Streets and Kipling Avenue (Six Points) Interchange	1,223,871	69,328
Danforth Road - Pavement Widening	-	77,267
Don Valley Parkway and Related Works;		
Bayview Avenue Extension	22,526	207,144
Carlton Street Connection to Bayview Avenue	75,561	41,193
Don Valley Parkway	3,835,742	2,943,184
Duke-Duchess Connection	-	1,236,716
Lawrence Avenue East Extension	125,817	2,159
Don Valley Parkway Extension	-	1,952
Don Mills Road;		
Extension, York Mills Road to Steele's Avenue	-	95,867
Grade Separation, C.P.R., north of Eglinton Avenue	-	-
Dixon Road - Widening;		
Highway 27 to Westerly Metropolitan Toronto Limit	-	1,261
Dufferin Street - Pavement Widening;		
Eglinton Avenue to Wilson Avenue	65,551	26,587
Dundas Street West - Pavement Widening;		
Old Dundas Street to Renown Road	24,959	722,111
Dundas Street West, Royal York Road and C.P.R. Grade Separation	89,700	133,395
Eglinton Avenue West Expressway	357 Cr.	160,218

Eglinton Avenue East Projects;		
Extension from Bessborough Drive to Victoria Park Avenue	232 Cr.	2,235
Grade Separation - C.N.R., Bellamy Road	6,701	133,469
- do. - - C.N.R., Kennedy Road	271,324	83,904 Cr.
Frederick G. Gardiner Expressway	12,127,815	16,153,300
Scarborough Extension of Frederick G. Gardiner Expressway	186,889	28,389
Islington Avenue Widening Projects	-	227,899
Jane Street Projects;		
Widening, Dundas Street to Wilson Avenue;		
Grade Separations, C.N.R. and C.P.R., south of Trethewey Drive	1,655,412	675,235
Keele Street - Pavement Widening;		
South Limit of North York to Sheppard Avenue	25,032	12,060
Kennedy Road and Danforth Road - Pavement Widenings;		
Danforth Road to Steele's Avenue, and		
Danforth Avenue to Kennedy Road, respectively	101,884	1,360,842
Kipling Avenue - Bridge over Mimico Creek	1,172 Cr.	-
- do. - - Grade Separation, C.P.R., south of Bloor Street	916,111	9,469 Cr.
Lawrence Avenue East - Widening, Paving and Bridges;		
East City Limit to Bayview Avenue, and		
Victoria Park Avenue to Kingston Road	771,710	234,087
Lawrence Avenue West, Scarlett Road and Dixon Road;		
Pavement Widening	15	10,646
Lawrence Avenue West - Widening;		
Yonge Street to Weston Road	276,281	1,197,391
Markham Road Projects;		
Widening and Bridges, Kingston Road to Highway 401	550,242	28,156
Grade Separation at C.N.R., north of Eglinton Avenue	10,490	60,816
Pape Avenue - Grade Separation at C.N.R., north of Gerrard Street	40,718	37,616
Prince Edward and Rosedale Viaducts - Repair	517,327	10 Cr.
The Queensway (Queen Street West Extension)	833	697

cont'd .....

	1961 $	1962 $
Rogers Road Bridge	-	5,511
Rosedale Valley Road - Property	8,521	-
Sheppard Avenue East - Grade Separation, C.P.R., Agincourt	84,128	511,523
Spadina Expressway;		
South Limit of North York to Wilson Avenue	36,279	513,605
Engineering Studies, Entire Project	38,285	20,379
Victoria Park Avenue - Widening and Bridges;		
Kingston Road to O'Connor Drive	79,123	320,570
Eglinton Avenue East to Sheppard Avenue	35,288	43,200
Wilson Avenue - Widening;		
Yonge Boulevard to Weston Road	24,828	55,551
	23,937,899	29,262,300
City of Toronto - Completion of Woodbine Avenue Subway, at C.P.R.	3,868	-
Capital Projects on Former King's Highways, of which the Department of Highways, Ontario, assumed 100% of Costs		
Bloor Street West - Pavement Widening;		
Royal York Road to Dundas Street	3,308	-
Bloor Street West - Grade Separation, C.P.R., at Islington Avenue	4,625	916
The Queensway - Pavement Widening;		
Dillon Avenue to Highway 27	630	-
Yonge Street - Pavement Widening and Bridge at Don River;		
North City Limit to Highway 401	-	60
Total Capital Expenditures	23,950,330	29,263,276

Current Expenditures

Administration	386,915	414,909
Roadway Maintenance	2,286,767	1,942,864
Bridge Maintenance	235,916	119,729
Winter Maintenance	1,158,665	1,972,706
Cleaning Roads	5,036	16,826
Road Signs	10,396	12,165
Intersectional Improvements and Special Items	622,000	756,702
Lighting, Major Roads	16,105	35,982
Passenger Loading Platforms	6,014	4,997
Renaming and Renumbering of Streets	1,986	2,340
Machinery and Equipment - Purchases	30,907	29,117
- do. - - Operation and Maintenance	66,699	73,546
Sundry - including Yard Operation, Insurance, and Employees' Fringe Benefits	154,450	166,222
Survey of Capital Works	4,172	27,560
Total, Current Expenditures	4,986,028	5,575,665

SUMMARY

Total Capital Expenditures	23,950,330	29,263,276
Total Current Expenditures	4,986,028	5,575,665
Total Expenditures, Gross	28,936,358	34,838,941

Subsidies and Contributions

Province of Ontario - Statutory Grants	13,873,759	16,214,166
Government of Canada - Railway Grade Crossing Elimination Fund	750,000	1,465,598
Railways and Area Municipalities	40,000	43,250
Winter Works Incentive Programme	-	26,498
Totals, Subsidies and Contributions	14,663,759	17,749,512
TOTAL EXPENDITURES, NET	14,272,599	17,089,429

W. C. Goldwin, C.A.

- SUMMARY OF CONTRACTS AWARDED -

Contract No.	Detail Contractor ** Consultants	Project Engineers	Contract Amount $	
1-61	Don Valley Parkway - Eglinton Avenue to north of Lawrence Avenue; Grading, Paving, Drainage, Lighting, River Relocations, including Check Dams, Lawrence Avenue Interchange Ramps, Two Railway Divisions, One Structural Steel Underpass, One Structural Steel Bridge Over Don River, Twin Concrete Arch Structures beneath C.P.R. Tracks, and Two Concrete Pedestrian Underpasses Robert McAlpine, Ltd. ** Fenco-Harris	A. F. Allman	2,723,958	#
2-61				
3-61	Frederick G. Gardiner Expressway - Interchange with The Queensway and South Kingsway; Grading, Asphaltic Concrete Pavement, Curbs and Gutters. Scott-Jackson Construction, Ltd. ** Lakeshore Expressway Consultants	K. M. Middleton	56,235	
4-61	Don Valley Parkway - At Grenoble Drive, Flemingdon Park; Reinforced Concrete and Structural Steel Four-Span Bridge Varamae Construction, Ltd. ** Fenco-Harris	A. F. Allman	157,274	
5-61	Frederick G. Gardiner Expressway - Spencer Avenue to York Street; Street Lighting System - Supply and Installation of Aluminum Poles, Luminaires and Secondary Circuits G. M. Gest Contractors, Ltd. ** Lakeshore Expressway Consultants	K. J. Gilbert	156,916	#
6-61	Jane Street - John Best Avenue to Pelmo Crescent; and Lawrence Avenue West - Martini Drive to Ralph Street; Asphaltic Concrete Pavement Leo Contracting Co., Ltd.	D. A. Patterson	384,118	
7-61	Bayview Avenue - South-bound Bridge over Don River at Lawrence Ave. East; Demolition of Existing Structure and Construction of Steel Tresses, Abutments, Piers and Bridge Deck Richardson Construction Co., Ltd. ** H. A. Babcock and Co., Ltd.	T. H. Johnston	532,147	

# ... Contract not completed. Award figure.

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8-61	Various Roads (Outside City) - Permanent Asphalt Repair of Utility Road Cuts Evans Contracting Co., Ltd. H. S. Watson	86,034
9-61	Spadina Avenue Bridge - South of Front Street; Replacement of Deck and Repair of Deteriorated Concrete Bedford Construction Co., Ltd. A. P. French	53,444
10-61		
11-61	Frederick G. Gardiner Expressway - Lake Shore Boulevard, Rees Street to York Street; Relocation of 20-inch High-Pressure Watermain T. Collini Co., Ltd. ** Lakeshore Expressway Consultants K. J. Gilbert	99,504
12-61	Don Valley Parkway - Royal Drive to Eglinton Avenue; Sign-Support Structures Donovan Construction Co. of Canada, Ltd. ** Fenco-Harris A. F. Allman	30,447
13-61	Keele Street - Rogers Road to Eglinton Avenue; Resurfacing Geo. W. Porter Construction Co., Ltd. H. S. Watson	51,144
14-61	Lawrence Avenue East - East of Kennedy Road to East of Markham Road; Pavement Widening, Intersectional Improvements at Midland Avenue, Bellamy Road and Markham Road; Sewers, Sidewalks and Bridge Deck Resurfacing Dufferin Construction Co. G. M. Bruce	743,489
15-61	Jane Street - Weston Road to Trethewey Drive; Bridge over C.P.R. and C.N.R., and Pavement Widening Patrick Harrison and Co., Ltd. ** Laughlin, Wyllie and Ufnal J. L. Shirley	1,188,557
16-61	Danforth Avenue - Jones Avenue to Woodbine Avenue; Resurfacing Geo. W. Porter Construction Co., Ltd. H. S. Watson	168,865
17-61	Frederick G. Gardiner Expressway - Spadina Avenue to Rees Street; Reinforced Concrete and Structural Steel Elevated Structure, and Lake Shore Boulevard East-bound Roadwork C. A. Pitts General Contractor, Ltd. ** Lakeshore Expressway Consultants K. J. Gilbert	1,958,609

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18-61	Frederick G. Gardiner Expressway - Rees Street to York Street; Reinforced Concrete and Structural Steel Elevated Structure, and Lake Shore Boulevard Roadwork, including Ramps at York Street C. A. Pitts General Contractor, Ltd. ** Lakeshore Expressway Consultants .... K. J. Gilbert	4,488,191	#
19-61	Markham Road - Prestressed Concrete Bridge over C.N.R., and Roadwork from Eglinton Avenue East to 1000 feet north of C.N.R. Dufferin Construction Co. ** Margison and Keith .... G. M. Bruce	404,681	
20-61	Improvement of Intersections - Danforth Avenue, at Birchmount Road; Don Mills Road, at Lawrence Avenue; Keele Street, at Keelgate Drive; Rexdale Boulevard, at Kipling Avenue; Sheppard Avenue, at Yonge Street; and Weston Road, at Albion Road Standard Paving, Ltd. .... H. S. Watson	62,145	
21-61	Improvement of Intersections - Bathurst Street, at Eglinton Avenue; Bathurst Street, at St. Clair Avenue West; Mt. Pleasant Road, at Eglinton Avenue; Pape Avenue, at Donlands Avenue; and Royal York Road, The Queensway to Dalesford Road John Cucci, Ltd. .... A. P. French	33,567	
22-61	Bloor Street West - Oakmount Avenue to Kennedy Avenue; Resurfacing Warren Bituminous Paving Co., Ltd. .... H. S. Watson	47,049	
23-61	Eglinton Avenue East - Mt. Pleasant Road to Bayview Avenue; Resurfacing K. J. Beamish Construction Co., Ltd. .... A. P. French	39,774	
24-61	Lake Shore Road - Fifth Street to Twenty-Third Street; Surfacing of T.T.C. Track Allowance Standard Paving, Ltd. .... H. S. Watson	88,696	
25-61	Various Roads - Dix-Seal Resurfacing Godson Contracting Co., Ltd. .... A. P. French	27,745	

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26-61	The Queensway - South Kingsway - Addition of Concrete Pedestrian Steps on Existing Structure Ruliff Grass Construction Co., Ltd. K. M. Middleton	12,764
27-61	Dundas Street West - Reinforced Concrete Box Structure Over Mimico Creek, and Channelization of Mimico Creek for 200 feet Patrick Harrison and Co., Ltd. ** Proctor and Redfern K. M. Middleton	234,314
28-61	Richview Side Road - Islington Avenue to Highway 27; Resurfacing Godson Contracting Co., Ltd. H. S. Watson	27,728
29-61	South Kingsway - Bloor Street to The Queensway; Resurfacing Johnson and Hogan Construction, Ltd. H. S. Watson	60,662
30-61	Old Weston Road Bridge - Over C.P.R., at West Toronto Station; Repair and/or Replacement of Deteriorated Concrete and Structural Steel; Waterproofing and Asphalt Paving Steed and Evans, Ltd. H. S. Watson	27,900
31-61	Dupont Street - Christie Street to Ossington Avenue; Resurfacing Johnson and Hogan Construction, Ltd. H. S. Watson	31,526
32-61	Frederick G. Gardiner Expressway - C.N.E. Grounds; Reinforced Concrete and Structural Steel Elevated Structure and Demolition of H.E.P.C. Laboratory Building Bedford Construction Co., Ltd. ** Lakeshore Expressway Consultants K. J. Gilbert	1,008,204
33-61	Victoria Park Avenue - Donside Drive to Denton Avenue; Asphalt Pavement, Arch Culvert and Sewer Relocation K. J. Beamish Construction Co., Ltd. J. L. Shirley	322,779
34-61	Maintenance Yard No. 4 - One-Storey Brick Building; J. H. Ross Construction Co., Ltd. ** Pentland and Baker, Architects H. S. Watson	22,472
35-61	Dundas Street West - St. John's Place to Jane Street; Resurfacing Johnson and Hogan Construction, Ltd. H. S. Watson	46,480

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36-61	Winter Salting and Snow Plowing - South-East Division; Miller Paving, Ltd. .... H. S. Watson	88,068	
37-61	Winter Salting and Snow Plowing - North-East Division; K. J. Beamish Construction Co., Ltd. .... H. S. Watson	80,471	
38-61	Winter Salting and Snow Plowing - North-West Division; K. J. Beamish Construction Co., Ltd. .... H. S. Watson	86,637	
39-61	Winter Salting and Snow Plowing - South-West Division; W. A. Ryder Paving, Ltd. .... H. S. Watson	77,403	
40-61	Winter Salting and Snow Plowing - Expressway System Evans Contracting Co., Ltd. .... H. S. Watson	68,948	
41-61	Frederick G. Gardiner Expressway - Cherry Street to Don River; Reinforced Concrete and Structural Steel Elevated Structure; Don River Diversion; Utility Bridge; Demolish and Reconstruct Keating Street Bridge; Reconstruct Lake Shore Boulevard East-bound and West-bound C. A. Pitts General Contractor, Ltd. ** Lakeshore Expressway Consultants .... K. J. Gilbert	6,756,934	#
42-61	Bayview Avenue - Lawrence Avenue East - Widening of Bayview Avenue, from Blythwood Road to Post Road, and on Lawrence Avenue, from Bayview Avenue to East City Limit; Construction of Reinforced Concrete Rigid Frame Bridge; Retaining Walls and Ramps at Intersection of Bayview and Lawrence Avenues; and Related Works, including North York Storm Sewer System Leo Contracting Co., Ltd. ** H. A. Babcock and Co., Ltd. .... T. H. Johnston	1,094,625	
43-61	Sheppard Avenue East - Construction of Storm Sewer Parallel to C.P.R. Tracks to Accommodate Drainage for Grade Separation at Agincourt Sam Cosentino, Ltd. ** A. M. Lount and Associates .... G. M. Bruce	40,044	
44-61	Frederick G. Gardiner Expressway - Strachan Avenue to York Street; Lighting of Ramps, Sign Structures Canada Electric Co., Ltd. ** Lakeshore Expressway Consultants .... K. J. Gilbert	141,342	#

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1-62	Kennedy Road - Construction of Reinforced Concrete Flat-Slab Deck Structure for Subway under C.P.R., south of Sheppard Avenue; including Pavement Reconstruction and Widening between Highway 401 and Jade Street, Drainage, Lighting Dufferin Construction Co. ** H. B. Tryhorn G. M. Bruce J. G. Flint	395,366	#
2-62	Sheppard Avenue East - Construction of Post-Tensioned, Pre-Stressed, Hollow-Boxed Concrete Deck Structure for Subway under C.P.R., Agincourt, including Pavement Reconstruction and Widening between Midland Avenue and Brimley Road, Drainage, Lighting Patrick Harrison and Co., Ltd. ** A. M. Lount and Associates J. G. Flint	1,048,694	#
3-62	Bayview Avenue - Post Road to York Mills Road; Pavement Widening, Drainage and Sidewalks Leo Contracting Co., Ltd. T. H. Johnston	244,275	
4-62	Lawrence Avenue West - Dufferin Street to Keele Street; Reconstruction, including Approaches and Excavation for Subway at C.N.R., Relocation of Sewers and Water Mains, Lighting, Sidewalks Swansea Construction Co., Ltd. ** Laughlin, Wylie and Ufnal J. L. Shirley	1,028,313	#
5-62	Don Valley Parkway - Frederick G. Gardiner Expressway to Bloor Street; Grading, Paving, Drainage, Lighting, Crib Walls, Anchor Walls and Sheet Piling Swansea Construction Co., Ltd. ** Fenco-Harris A. F. Allman	1,877,289	#
6-62	Various Roads (Outside City) - Permanent Asphalt Repair of Utility Road Cuts Evans Contracting Co., Ltd. M. R. Browning	66,396	
7-62	Dupont Street - Campbell Avenue to Dundas Street West; Resurfacing Godson Contracting Co., Ltd. M. R. Browning	36,553	
8-62	Don Valley Parkway - Repairs to Dundas Street East Bridge over Don River; Replacement of East Approach Spans, East Abutment, Structural Steelwork and Existing Bridge Deck Steed and Evans, Ltd. J. Watson	539,940	

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9-62	Frederick G. Gardiner Expressway - Jameson Avenue to Spadina Avenue; Asphalt Paving and Waterproofing of Elevated Concrete Road Deck Warren Bituminous Paving Co., Ltd. ** Lakeshore Expressway Consultants K. J. Gilbert	297,435
10-62	Eglinton Avenue West - Kane Avenue to Bicknell Avenue; Resurfacing Warren Bituminous Paving Co., Ltd. M. R. Browning	36,967
11-62	Kingston Road - Woodbine Avenue to Victoria Park Avenue; Resurfacing Raponi Eastwood Paving and Construction, Ltd. M. R. Browning	103,002
12-62	Spadina Avenue - College Street to Richmond Street; Resurfacing Crosstown Paving Co., Ltd. M. R. Browning	72,460
13-62	Improvement of Intersections - Keele Street, at Calvington Drive; Keele Street, at Sheppard Avenue; Kingston Road, at Brimley Road; Kipling Avenue, at Dixon Side Road; Lawrence Avenue East, at Pharmacy Avenue; Lawrence Avenue East, at Victoria Park Avenue; Lawrence Avenue East, at Warden Avenue; St. Clair Avenue East, at Midland Avenue; St. Clair Avenue East, at Warden Avenue; and Wilson Avenue, at Clayson Road John Cucci, Ltd. A. P. French	107,322
14-62	Dundas Street East - Parliament Street to Don River; Resurfacing Johnson and Hogan Construction, Ltd. A. P. French	63,460
15-62	Dundas Street West - St. Clair Place to Six Points Interchange; Pavement Widening, Relocation of Old Dundas Street, Extension or Diversion of Certain Existing Streets, and Installation of Storm Sewer Crosstown Paving Co., Ltd. K. M. Middleton	620,192 #
16-62	Spadina Road Extension - Beechmount Avenue Storm Drain Extension, from Ranee Avenue to Highway 401 Malvern Construction Co., Ltd. ** M. M. Dillon and Co., Ltd. K. M. Middleton	177,615

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17-62	Richview Side Road - Islington Avenue to Scarlett Road; and on Trethewey Drive - Eglinton Avenue West to Jane Street; Resurfacing Godson Contracting Co., Ltd. A. P. French	30,075	
18-62	Frederick G. Gardiner Expressway - Humber River to Jameson Avenue; Resurfacing Warren Bituminous Paving Co., Ltd. M. R. Browning	67,628	
19-62	Frederick G. Gardiner Expressway - Jarvis Street to Parliament Street; Reinforced Concrete and Structural Steel Elevated Structure; Reconstruct Lake Shore Boulevard East-bound and West-bound Russell Construction, Ltd. ** Lakeshore Expressway Consultants K. J. Gilbert	4,077,000	#
20-62	Frederick G. Gardiner Expressway - Parliament Street to Cherry Street; Reinforced Concrete and Structural Steel Elevated Structure, Reconstruct Lake Shore Boulevard East-bound and West-bound; and Construction of Detour Roads on Parliament, Mill and Front Streets C. A. Pitts General Contractor, Ltd. ** Lakeshore Expressway Consultants K. J. Gilbert	3,133,802	#
21-62	Improvement of Intersections - Bathurst Street, at Eglinton Avenue West; Bathurst Street, at Lawrence Avenue West; Dixon Side Road, at Riverview Heights; Eglinton Avenue West, at King George Drive; Lake Shore Boulevard East, at Carlaw Avenue; Laird Drive, at Millwood Road; and Mt. Pleasant Road, at Whitehall Road John Cucci, Ltd. A. P. French	60,145	
22-62	Danforth Road - Danforth Avenue to Kennedy Road; and on Kennedy Road - Danforth Road to Eglinton Avenue; Pavement Reconstruction and Widening, and Related Intersectional Improvements Dufferin Construction Co. J. G. Flint	869,414	#
23-62	Lake Shore Boulevard West - Miles Road to First Street; Resurfacing of T.T.C. Track Allowance King Paving and Materials, Ltd. A. P. French	48,894	

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24-62	Lawrence Avenue West - Bathurst Street to Dufferin Street; Pavement Widening and Installation of Storm Sewer Leo Contracting Co., Ltd. K. M. Middleton	350,611	
25-62	Islington Avenue - Dixon Road to Lemsford Road; Pavement Reconstruction and Sidewalks Leo Contracting Co., Ltd. T. H. Johnston	137,037	
26-62	Jane Street - Renovation of Building Ostvik Construction, Ltd. J. L. Shirley	30,207	
27-62	Yard No. 1, Downsview - Addition to Service Building Harry S. Hall, Ltd. ** Pentland and Baker, Architects M. R. Browning	19,666	
28-62	Weston Road - St. Clair Avenue to Northland Avenue; Resurfacing Johnson and Hogan Construction, Ltd. M. R. Browning	41,321	
29-62	Jane Street - Pelmo Crescent to Wilson Avenue; and on Wilson Avenue - Epic Lane to Dallner Road; Pavement Reconstruction, Bridge Demolition, Installation of Storm Sewers and Sidewalks Dufferin Construction Company T. H. Johnston	466,815	#
30-62	Winter Salting and Snow Plowing - Various Roads - South-East Division Miller Paving, Ltd. M. R. Browning	84,231	
31-62	Winter Salting and Snow Plowing - Various Roads - North-East Division K. J. Beamish Construction Co., Ltd. M. R. Browning	88,304	
32-62	Winter Salting and Snow Plowing - Various Roads - Central, and Expressway System Evans Contracting Co., Ltd. M. R. Browning	68,290	
33-62	Winter Salting and Snow Plowing - Various Roads - North-West Division K. J. Beamish Construction Co., Ltd. M. R. Browning	79,927	
34-62	Winter Salting and Snow Plowing - Various Roads - South-West Division W. A. Ryder Paving, Ltd. M. R. Browning	76,004	

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35-62	Frederick G. Gardiner Expressway - Installation of Transformers, Switchgear and Supply and Installation of Distribution Circuits for Heating of Ramps at Spadina Avenue Black and McDonald, Ltd. ** Lakeshore Expressway Consultants .... K. J. Gilbert	21,195	
36-62	Don Mills Road Extension - York Mills Road to 2000 feet northerly; Bridge over Don River, east branch, River Diversion, Sheet Piling, Concrete Channel Lining, two Check Dams, Piling, Culverts, Lighting, etc. C. A. Pitts General Contractor, Ltd. ** Ewbank, Tupper and Associates, Ltd. .... A. F. Allman	959,280	#
37-62	Spadina Road Extension - Underpass Structures at Lawrence Avenue West and Flemington Road, Rapid Transit Station, Relocation of Water Main, Lighting, etc. Patrick Harrison and Co., Ltd. ** M. M. Dillon and Co., Ltd. .... K. M. Middleton	561,861	#

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